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ABSTRACT

The pilot evaluative study of the use and effectiveness of the Expanded Food and Nutrition Education Program (EFNEP) Youth Nutrition Lesson Series focused upon its effectiveness in producing nutrition behavior change (nutrition knowledge, nutrition attitudes, and food intake) based upon the concepts, values, and principles presented in lessons 1-6 of a 10-lesson series. The study involved 1,368 disadvantaged youth through 12 years of age in Minnesota, North Carolina, Oklahoma, and Vermont. Two experimental groups, one in an extension setting and one in a formal school setting, and a control group were established to assess changes that might be due to environmental factors and maturation of youth. The study indicated that lessons 1-6 effected significant nutrition behavior change in both the extension and school setting groups; however, nutrition behavior, as reflected by pretest/posttest questionnaires, was consistently greater in the extension group. Moreover, nutrition knowledge appeared greater than the change in nutrition attitudes. The selected sociocultural characteristics of the youth and their families appeared to have little effect upon the degree of nutritional behavior change that occurred. The lesson series did not alter the food intake patterns of the youth. Questionnaires are appended. (Author/EA)

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THE EFFECT OF EXTENSION SERVICE'S YOUTH NUTRITION LESSON SERIES ON BEHAVIORAL CHANGE IN EFNEP YOUTH UTILIZING DIFFERENT EDUCATIONAL ENVIRONMENTS AND TEACHERS

An Evaluative Study of the Use and Effectiveness of a Lesson Series Developed by Extension Service, USDA for EFNEP Youth (ages 8-12 years)

Principal Authors
and
Co-Directors of Research

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A study conducted by the North Carolina Agricultural Extension Service, in cooperation with the Minnesota Extension Service, Oklahoma Extension Service, and Vermont Extension Service, under Cooperative Agreement No. 12-05-300-280 with the Extension Service, U. S. Department of Agriculture, Washington, D. C.

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PREFACE

On March 27, 1974, the North Carolina Agricultural Extension Service contracted with Extension Service, USDA, to conduct an evaluative study of the use and effectiveness of the Expanded Food and Nutrition Education Program (EFNEP) Youth Nutrition Lesson Series developed in 1972 by the Home Economics Division, Extension Service, USDA. The 10 nutrition lessons were designated for use in instruction of EFNEP youth between the ages of 8 and 12, from lower socioeconomic areas, both rural and urban, and with different ethnic backgrounds. The Lesson Series has been used extensively throughout the United States for approximately two years prior to the evaluation in an effort to alter nutrition behavior of disadvantaged youth, i.e., their nutrition knowledge, attitude (food preferences), and food intake patterns. This study was a pilot effort as no other study to our knowledge had previously been conducted to evaluate the Lesson Series' effectiveness in altering nutrition behavior of disadvantaged youth. The present document describes such a study. The emphasis of this evaluative study was to determine the effectiveness of the Lesson Series in producing nutrition behavior change (learning) based upon the concepts, values and principles of nutrition in Lessons 1 through 6 of a 10-lesson Nutrition Lesson Series. Involving 1368 youth 8 through 12 years of age in four states (Minnesota, North Carolina, Oklahoma, and Vermont), the study documents nutrition behavior change which can be related to disadvantaged youth's participation in at least five of the first six lessons of the EFNEP Youth Nutrition Lesson Series. This final report describes the study and interprets its findings.

The report consists of three parts. PART I presents a *Summary and Implications*. It focuses on: (1) the purposes of the research project; (2) results and conclusions; (3) implications; and (4) recommendations. This summary is organized to provide the reader with a quick overview of the major findings of the study.

PART II, *Technical Report*, is a detailed description of the study's design and a presentation and interpretation of study findings.

PART III, *List of References and Glossary*, includes (1) the major source of references drawn upon in designing, implementing and evaluating the research study and (2) definitions of important terminology employed throughout the report for use by analytical readers. The definitions are grouped in alphabetical form under three categories to describe: (1) dietary adequacy; (2) nutrition education; and (3) personnel and clientele participating in the research study.

The North Carolina Agricultural Extension Service desires to express its appreciation to the Extension Service, USDA, for the opportunity and privilege to serve as the coordinating state in the conduct of this EFNEP research project. The researchers and host state trust that the findings of this research will be helpful to Extension Service personnel nationwide in planning, implementing and evaluating future programs for disadvantaged youth in nutrition education utilizing the Extension Service's Youth Nutrition Lesson Series.

NCSU
Raleigh
January 1, 1976

George Hyatt, Jr.
Edgar J. Boone
Estelle E. White

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Appreciation is also expressed to the numerous other people and organizations outside the Extension Service who assisted with the research project. Particular thanks are due all volunteers, secondary school personnel and students who cooperated with the state Extension service staff in each of the four states in making possible the findings of this research report.

Special acknowledgement is given Evelyn H. Johnson, Specialist, Foods and Nutrition, and Rhonwyn Lowry, Deputy Assistant Administrator, 4-H Youth, both of the Extension Service, USDA, for their assistance and support in the conduct of the study. Special recognition is due Evelyn Johnson for her role in the development of the Extension Service's Nutrition Lesson Series (evaluated in this study) and her concern for the importance of its evaluation.

A very special word of gratitude is extended to the reviewers of this manuscript who were so helpful in providing ideas, comments, and objective reviews. The researchers especially wish to recognize and thank the following persons who served as reviewers in addition to the research team: Chester D. Black, T. C. Blalock, Mary Carlson, Eloise Cofer, Carl J. Dolce, Marjorie Donnelly, Evelyn D. Harne, George Hyatt, Jr., Evelyn Johnson, Sue Kruse, Rhonwyn Lowry, C. Paul Marsh, Larry A. Nelson, R. J. Peeler, and J. C. Williamson, Jr.

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Acknowledgement must also be made to a great number of people unknown to the Directors of this research, as many persons in the four states have contributed in some way to the development of this research report. To all these and more, the researchers say "thank you."

Edgar J. Boone
Estelle E. White
Co-Directors of the Research

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PART I. SUMMARY AND IMPLICATIONS[1]

A. *Purpose and Perspective*

The central focus of this evaluative research was the assessment of nutrition behavior change (i.e., change in nutrition knowledge, attitude, and food intake) in disadvantaged youth attributable to being taught the first six lessons of the 10-lesson Youth Nutrition Lesson Series. The change in the learner was measured by the difference between mean pretest/posttest scores on questionnaires pertaining to the three components of nutrition behavior. In two experimental groups the pretest was administered before exposure to Lessons 1 through 6 of the Series; the posttest, after exposure to at least five of the first six lessons. The control group took the pretest and posttest, but was not exposed to the Lesson Series during the study.

The other purpose of the study was to determine the extent to which (1) certain sociocultural characteristics of the learner, his family, and teacher and (2) certain factors in the teaching/learning environment were associated with the nutrition behavior change that occurred in youth taught the Lesson Series. Learner characteristics assessed were: age, sex, grade in school, place of residence (rural/urban), and participation in school food programs. Family characteristics were: income, number of children in family, age of homemaker, level of formal education of head-of-household, occupation of head-of-household, and homemaker's participation in The Expanded Food and Nutrition Education Program (EFNEP). Teacher characteristics were: type of teacher (volunteer, aide, or classroom teacher), age, sex, education, income, and socioeconomic status (income/education levels). Factors in the teaching/learning environment were: group size, teaching/learning setting, lesson time frame, lesson frequency, and teaching strategies.

The primary questions toward which this evaluative research was directed were:

1. What nutrition behavior change in the disadvantaged learner—i.e., change in nutrition knowledge, nutrition attitude, or food intake—was attributable to being taught Lessons 1 through 6 of the Nutrition Lesson Series?

[1] See Part II of the Technical Report, page 12, for a detailed discussion of supporting data for "Summary and Implications."

2. Which topics or concepts in the lessons taught were most effectively presented as measured by the nutrition behavior change in the learner?
3. What sociocultural characteristics of the youth participant and his family were related to the nutrition behavior change that occurred?
4. What teacher characteristics were related to the nutrition behavior change that occurred in the youth they taught?
5. What factors in the teaching/learning environment were associated with the nutrition behavior change in youth taught the first six lessons of the Lesson Series.

The target population for the research was disadvantaged youth eligible to participate in the 4-H Youth Phase of EFNEP or with similar characteristics. The study participants included youth who were 4-H age (8 through 12) from EFNEP or Aid to Dependent Children families living in "low-income" geographic areas of cities, receiving "free or reduced school lunch," or participating in other programs for low-income youth. In addition, the youth were to have had no previous exposure to the Lesson Series. States selected by the Extension Service, USDA, to participate in the study were: Minnesota, North Carolina, Oklahoma, and Vermont. North Carolina coordinated the study. The respective State Extension staff selected the participants within their states.

Youth eligible for the 4-H youth phase of EFNEP were selected by each of the four states to participate in one of three groups--two experimental and a control. The two experimental groups, termed Group I and Group II, were established for treatment with the first six lessons of the Lesson Series in Minnesota, North Carolina, and Oklahoma. (Vermont established only one experimental group, Group I.) The control group was to take the pretest and posttest, but have no exposure to the Lesson Series during the study. Group I was to be taught in small groups of 6 to 10 youth in an informal, Extension type setting, with kitchen facilities available whenever possible. Group II was to be taught in larger groups of 10 to 30 youth in the more formal classroom type setting, usually in the school. The control group was to be established in a school or community setting.

The research instruments developed to gather the necessary data were: Pretest and Posttest Youth Booklets, the Attendance Record, a Personal Data Questionnaire for the adults who conducted the study, and the Lesson Evaluation form. The Youth Booklets contained three sections on nutrition: Nutrition Knowledge (34 items), Nutrition Attitudes and Practices (21 items), and Food Intake (8 items). Thirty-one items related to self-concept and school attitude were included in the booklets, but were not

treated in the analysis of study findings due to insufficient data. The pretest also included a Personal Data on Youth's Family form. Information concerning the youth and the administrator of the questionnaires was obtained from forms within each booklet. An attendance record was kept by the administrator or teacher for each youth group. Data obtained from those records were utilized to determine which youth in Group I and II had met the requirements to be included in the study, i.e., had taken the pretest, had completed five of the six lessons, and had taken the posttest. The control group youth were required to complete the pretest and posttest to be included in the study.

The Personal Data form for the adults participating in the study provided data about type of teacher and other selected teacher characteristics. The Lesson Evaluation form that was completed by the teacher after each lesson was taught described the teaching/learning environment, the degree to which the teacher felt the lesson's objectives were met, and the teaching strategies used.

The general profile of the 1368 youth in the states of Minnesota, North Carolina, Oklahoma, and Vermont was a 10-year-old female in the fourth or fifth grade, living in an urban area and participating in the School Lunch Program. These youth were members of 1080 families in the four states. The youth's family had four or more children, a homemaker 26 to 35 years of age who was a nonparticipant in EFNEP, was white, and had an income of less than $417 per month. The head-of-household was a service worker, a laborer, or unemployed with a high school education or less. Definite differences in the characteristics of the youth and their families existed between the states and within the groups.

Each state selected the personnel to involve in the research study. The "teachers" were characterized as the aides, volunteers, and classroom teachers who taught the lessons to Group I or Group II youth or gave the pretest/posttest to the control group. In the four states, the teachers for Group I (Extension setting) were 48 aides and 23 volunteers. In three states, for Group II (school setting) (no Group II in Vermont) there were 5 aides, 29 teenage volunteers, and 5 classroom teachers. The control groups were administered the pretest/posttest by 12 aides, 1 volunteer, and 4 classroom teachers. The teenage volunteers working with Group II were recruited through the schools and trained by the Minnesota Extension Service to teach the lessons.

Variations in the research design and methodology also existed between states. Minnesota conducted the study in one county, North Carolina in two, Oklahoma in three, and Vermont in twelve. Minnesota elected to eliminate socioeconomic data from

the questionnaires due to recent federal legislation (Buckley Admendment). Recognized limitations of this study are the autonomous nature of each state's Extension Service, the selection of personnel to participate in the study by each state, the design of the research, and the difficulty in determining the socioeconomic status of families due to the recent legislation.

B. *Results and Conclusions*

The major thrust of the research was to determine whether nutrition behavior change, i.e., nutrition knowledge, nutrition attitudes, and food intake, occurred in disadvantaged youth of ages 8 through 12 that were taught Lessons 1 through 6 of the Nutrition Lesson Series, especially in an Extension setting (Group I) with Extension personnel for which they were developed. However, a second experimental group (Group II) in the more formal school setting was established as a comparison group plus a control group to assess the change that might be due to environmental factors and maturation of the youth.

The major result of the study established that Lessons 1 through 6 effected significant nutrition behavior change in the youth in both the Extension setting (Group I) and the school setting (Group II). However, the degree of nutrition behavior change was consistently greater in the Group I youth than in the Group II youth in the three states with two experimental groups. The combined change (difference between pretest/posttest scores) between the four states was 8.27 for Group I and 3.78 for Group II. In the control group the combined mean difference score was 0.07, which indicates negligible change in the youth during the period of the study due to other factors.

The nutrition knowledge or cognitive behavior change that occurred in Groups I and II who were taught the lessons during the period of the study (six to eight weeks) was greater than the change in nutrition attitudes. Comparing within each group for the four states combined, the nutrition knowledge mean difference scores were 6.95 and 2.82, as compared to attitude mean difference scores of 1.22 and 0.83, for Group I and Group II, respectively.

However, the nutrition attitude change (affective change) in the youth exposed to the Lesson Series during the research was also significant when the mean difference scores of the four states were combined. The change in Group I was 1.22 as compared to 0.83 for Group II youth. The score was based on the sum of responses for 21 items. The lessons did alter nutrition attitudes, as well as the nutrition knowledge, of the youth taught.

The Lesson Series did not alter the food intake patterns of the youth. This component was measured on the basis of one entry and one exit 24-hour food intake inventory. Minnesota was the

only state that appeared to have a change in food intake. Food intake patterns apparently require a longer period for change to occur unless special emphasis is given this behavior.

The pictorial questions in the Nutrition Knowledge section of the pretest/posttest were grouped according to each lesson's behavioral objectives to establish the impact of each lesson on cognitive change in the youth. A one-tailed t-test was used to determine the significance of the mean difference scores between the pretest/posttest for each experimental group and the control group. The knowledge change for Group I (Extension) youth was significant for all topics in the first six lessons of the Series. The change in Group II (school) was significant for all topics but SNACKS. In the control group no significant change occurred in the youth except for the topic, BREADS AND CEREALS, which might be attributed to environmental factors or increased awareness.

Family characteristics of the learner that accounted for variation in nutrition behavior change included: the family income and the age of the homemaker. Nutrition behavior change in the youth was significantly (.05 level) related to the family income level in North Carolina and Oklahoma's Group I when the income level was $84/month or more and in Vermont's Group I when the family's income was $334 or more. Greater variations existed in Group II between the states as to the relationship of family income and the nutrition behavior change in the youth. For significant levels of change to occur, the income per month was $168 or greater in North Carolina and $418 or greater in Oklahoma. The other two states could not be compared as Vermont did not have a Group II and Minnesota did not collect these socioeconomic data. Therefore, the degree of nutrition behavior change in the youth whose family was in the lower income group was less than those with higher incomes.

When mothers of the children in the 26 to 35 age category were combined for the states, the nutrition behavior change in the youth of these families was greater than the change in those learners whose mothers were in the other age groups. The mean difference change scores decreased in size progressively for mothers in the older age groups in all three states except for the 36 through 45 age group in Vermont.

Other learner and family characteristics investigated that were not significantly associated with the nutrition behavior change in the youth included: the learner characteristics of age, grade in school, sex, place of residence (rural/urban), participation in school food programs; the family characteristics of number of children in the family, formal education level and occupation of head-of-household, and homemaker's participation in EFNEP.

However, state and group differences existed for many variables which affected the nutrition behavior change observed in the youth participants.

The Lesson Series as used in this study appeared to be effective in producing change in youth regardless of age or grade. The youth in the Group I Extension setting were mixed as to age and grade level. These youth consistently demonstrated a greater nutrition behavior change than the Group II youth, in a more formal school setting, who were usually the same age and grade level.

The Lesson Series appeared to meet the needs of disadvantaged youth for nutrition education regardless of the place of residence or the expected exposure to nutrition materials through other educational programs, such as the school food programs. The lessons were effective in producing nutrition behavior change with youth in both rural and urban areas and with those who were participants, as well as nonparticipants, in the school food programs.

The nutrition behavior change in the females was slightly greater than that assessed in the males exposed to the Lesson Series. The study population was comprised of three-fifths female learners between the four states. The activities and methods chosen to teach the Lesson Series may have stimulated more interest in the females than the males involved in the study.

Teacher characteristics that accounted for variation in nutrition behavior change included type of teacher, level of formal education, and socioeconomic status. Youth taught by aides showed a greater change than those taught by volunteers or classroom teachers. Volunteers produced greater change in their learners than classroom teachers. In general, teachers with more formal education produced greater change in the participants than those who had a high school education or less. Socioeconomic status was determined by combining income and level of formal education of teacher. The 689 youth taught by indigenous teachers excelled over those taught by the middle-class teacher.

The nutrition behavior change in the learner produced by the Lesson Series and the factors in the teaching/learning environment that were associated with the change included: group size, teaching/learning setting, lesson time frame, and lesson fequency. Group I youth were taught in an informal Extension setting, usually in a home or community center with kitchen facilities available for food preparation. The size of the group was usually 6 to 10 youth. Group II was taught in a more formal setting, usually in the school with classroom size groups of 10 to 30 youth. The Group I youth consistently experienced greater gains

in mean scores (or change) than did the youth in Group II. The greater change in Group I would indicate that certain factors in the Extension type teaching/learning environment are more conducive to presentation of the Lesson Series for maximum learning in disadvantaged youth than the school or formal environment.

The Lesson Series was more effective in producing nutrition behavior change in the Extension teaching/learning situation with the aide or volunteer, than in a more formal setting with aides, volunteers, or classroom teachers presenting the lessons. In the informal setting (Extension) the greatest amount of nutrition behavior change occurred in classes lasting more than an hour. In the formal setting classes lasting 45 minutes or less tended to produce the greatest nutrition behavior change in the learners. In both settings, classes taught once a week produced greater nutrition behavior change in learners than those taught more frequently.

The Leader's Guide for the Lesson Series, as well as the lessons themselves, provided teaching strategies that the aides and volunteers utilized effectively with the learner to bring about changes. The majority of the teachers were found to utilize a combination of strategies, i.e., reading, observation, and participation, to present each lesson. Therefore, no single method of teaching was directly associated with the degree of nutrition behavior change that occurred in the youth. The teachers' reactions in the lesson evaluations to the Series were generally favorable. They felt able to accomplish the lesson objectives, to use the activities and involve the youth, and to be satisfied with their presentation of the lesson. Therefore, the lessons apparently meet the needs of the aide, volunteer, and classroom teacher as a teaching tool for nutrition education.

C. *Implications*

There appear to be a number of important implications for the Extension Service at all levels, the 4-H Youth Phase of EFNEP, and others involved in nutrition education. Prior to this study, no empirical research had been performed to assess the effectiveness of the Youth Nutrition Lesson Series in bringing about nutrition behavior change in disadvantaged youth, ages 8 through 12, that would apply to various regions of the nation. Although this study was limited to four states—Minnesota, North Carolina, Oklahoma, and Vermont—findings provided some insight into the need for, as well as the potential for, providing nutrition education through the EFNEP youth program as currently operating.

The selected sociocultural characteristics of the youth and their families appeared to have little effect upon the degree of nutrition behavior change that occurred in this study. This would imply that all children, not just the disadvantaged, could benefit from similar nutrition education materials. Such materials provide useful information about adequate diets and good food habits to each youth; hopefully, this information would be shared with his family. The need is evident for programs and materials that provide direct experiences with food and nutrition for the youth of the nation. Packaging of properly sequenced and integrated materials, plus a delivery system such as EFNEP Youth Program, is imperative to the production of the greatest possible nutrition behavior change in youth.

The people in EFNEP are accountable for appropriate program content and program delivery to the designated audience (Guide for EFNEP, 1974). This indicates that there is a need for ongoing evaluation of the materials and the program to be certain that the objectives established for each are being met. As the needs of youth change, the program materials and content should be revised.

The research instrument developed for this study included a pretest and posttest Nutrition Knowledge questionnaire, a Nutrition Attitudes and Practices questionnaire, and a Food Intake form. These instruments were used in the four states to assess the degree of nutrition behavior change in disadvantaged youth during the time of the study. The findings of this study implied that such instruments could be used in any locale, and with available personnel, to simplify the process of summative evaluation of the effectiveness of EFNEP Youth Nutrition Lesson Series in creating nutrition behavior change in participating youth.

Although four states participated in this study and there were differences in the target groups, each state was able to adapt the research design and methodology according to its ability to identify target populations and handle the project with current personnel. This implies that the research design and methodology, as well as the research instrument itself, had adequate versatility to be utilized well by the many different persons involved in the research study. The Training Manual developed for the study apparently was effective in meeting the needs of those who conducted the research. However, future replications of this study should stress the fact that uniform data and treatments are imperative to make valid comparisons between groups and states.

One criterion for eligibility of youth to participate in this study was no previous exposure to the Lesson Series. The selection of such "new" clientele resulted in contact with many low-income and disadvantaged youth as potential EFNEP Youth Nutrition Lesson Series participants. This recruitment stimulated interest

in and enthusiasm for the nutrition education program on the part of those involved, including the youth. Currently, new groups of youth are being formed to include those who were unable to participate in this study and had expressed a desire to become "involved." The feeling was expressed by the State Coordinators that their state's involvement in the study had a beneficial effect upon their EFNEP youth program. These favorable reactions from both youth and EFNEP administrators in states as widely separated as Minnesota, North Carolina, Oklahoma, and Vermont strongly imply that the research instrument and the Training Manual developed for this study could be useful tools in evaluating the Youth Nutrition Lesson Series wherever used.

Even though the purpose of this study was to evaluate the effectiveness of the Lesson Series in producing nutrition behavior change, the fact that the greater nutrition behavior change occurred consistently in Group I (Extension) learners rather than in Group II (school) learners indicated that factors other than the sociocultural characteristics tested were involved. This implies that the setting in which the groups were taught was important to the change that occurred in the learner.

D. *Recommendations*

Further research utilizing other states or regions of the country replicating this study is needed to determine whether the Lesson Series effectively meets their needs for nutrition education materials to utilize with youth, ages 8 through 12. The instruments should be modified and simplified for such a study. Only information that is directly related to the learner and his nutrition behavior should be included in the evaluative type instrument for nutrition behavior change. The learner characteristics may be obtained from the youth by use of a simple information sheet or check-list.

The framework for such a study requires careful consideration of the following: the selection and training of personnel to conduct the study, the establishment of target youth groups to be taught, the administering of the instruments so data are comparable between states, and methods to be used for the research. The study needs to be carefully coordinated in each state and requires personnel with special interest in the research, the program, and the youth and personnel involved in the study.

An instrument such as the pretest/posttest may be utilized for continuous evaluation of the Lesson Series and the success of the 4-H Youth Phase of EFNEP in producing nutrition behavior change. Revisions of the instrument should be developed which include wider food choices and consider regional and cultural differences. These instruments should be tested for reliability and

content validity (behavioral objectives) with youth similar to potential target populations.

Additional nutrition education materials with suggested strategies for the teachers to use with the youth should be developed and tested with 8 through 12-year-old youth. Further study of the effectiveness of the Series with extremely low-income families might be pursued since few families in this income range were included and those that were had less nutrition behavior change occur in the youth than youth in families with higher incomes.

The guidelines for the Youth Phase of EFNEP (Guide, 1974) specify that volunteers are to teach nutrition and the related subject-matter areas to the youth groups whenever possible. For this reason, the Lesson Series was developed to be utilized by indigenous volunteers. Most of the volunteers in this study had family members involved and performed service or supportive roles. Few volunteers within the states actually taught the Lesson Series for the study because most were unaccustomed to serving in leadership or teaching roles. Adults and older youth should be encouraged to assume leadership roles so that they may assume the "teaching" position. Wherever possible, these volunteers should be drawn from already existing Extension programs, such as EFNEP homemakers. Each state needs a developmental program for "indigenous" leaders or teachers from the volunteer group, starting them in service capacities and providing opportunities for them to assume more active leadership and teaching responsibilities over a period of time. During this developmental period for the volunteers, adequate support should be provided by the Extension professional staff to maintain a strong youth program in nutrition education.

Based on the experience gained from this research, it is recommended that any future replications extend over a time frame of at least two years. This would allow for adequate development and testing of materials to be used; training personnel to be involved; collecting, analyzing, and interpreting the data; and writing, editing, and reproducing materials related to the study.

PART II. TECHNICAL REPORT

The technical report on this evaluative study of the EFNEP Youth Nutrition Lesson Series is presented in three sections. Section A presents the background information, purposes, and objectives of the research project; the conceptual framework around which the research project was designed; and limitations of the study. Section B describes the methodology used in evaluating the EFNEP Youth Nutrition Lesson Series, i.e., the research design, population studied, instrumentation, data collection process, and statistical procedures used in measuring the variables. Section C presents the results of measuring the study variables and an interpretation of those results.

A. *Background for the Study*

Public awareness of the low-income or disadvantaged family's special need for assistance with nutrition education to meet dietary requirements evolved after the 1965-1966 household food consumption survey. The findings of the survey, released in January, 1968, showed that diets of the American people were nutritionally poorer than had been reported in a similar 1955 survey (Dietary Levels, 1967). The major findings of the 1965-1966 survey indicated that decreased use of milk and milk products, vegetables, and fruits had resulted in undesirable dietary levels of calcium, ascorbic acid, and vitamin A. The diet was considered "poor" if one or more of the seven nutrients studied fell below two-thirds of the Recommended Dietary Allowances (RDA). "Good" diets met the allowances for all nutrients. In 1965-1966 one-half of the households surveyed had good diets as compared to 60 percent in the 1955 survey. "Poor" diets had increased from about 15 percent in 1955 to 20 percent in 1965-1966. The remaining 30 percent of the households in 1965-1966 had diets ranging from "good" to "poor." This meant the diets did not meet all the recommended dietary allowances for the seven nutrients, but the level of intake for any of the seven nutrients studied did not fall to two-thirds of the RDA (Dietary Levels, 1967).

The survey findings showed adequate incomes do not ensure adequate diets, but low-income households (poverty level of less than $3,000) were more prone to have inadequate diets. The diets of 63 percent of the poor failed to meet the allowances for one or more nutrients; those of 36 percent were classified as "poor" (Dietary Levels, 1967). As a result of this survey, state Cooperative Extension Services began to expand their nutrition education efforts to focus on families with young children, low-income families, and the aged, as well as the general public.

The aroused public interest in nutrition education programs for the disadvantaged received attention from several federal agencies and professional groups. The need for realistic nutrition programs with immediate application for the disadvantaged was recognized by legislators, nutritionists, and educators. As a result, such programs as EFNEP, the Food Stamp Program, and the school food programs were established, maintained, and expanded.

The interest in the nutritional status of low-income families continues. The U.S. Senate maintains surveillance on the effects of poverty on malnutrition in the U.S. through a Select Committee on Nutrition and Human Needs.

The Expanded Food and Nutrition Education Program (EFNEP) was established to provide nutrition education for the disadvantaged. The program was initiated by the Extension Service, USDA, in November, 1968, with $10 million of USDA Section 32 funds. Emphasis in this program was to be on food and nutrition, and indigenous "program aides" were to be hired and trained by county Extension home economists to teach low-income families nutrition education on a one-to-one basis.

Evidence of continuing concern about the nutritional quality of the American diet was found in the report of the White House Conference on Food, Nutrition, and Health (1970). The Conference recognized the need for nutrition education at all academic levels, and that parents and other community members should be involved. A special section of the Conference was concerned with providing popular nutrition education that would reach the disadvantaged. Some of the recommendations made by the panel included: a Free Lunch Program, reforms in food assistance programs, mass media utilization for nutrition education as a public service, development of a national information service to train neighborhood leaders, and utilization of food delivery systems (School Lunch Program, for example) for nutrition education (White House Conference: Recommendations, 1970).

The American Dietetic Association and other groups concerned with nutrition education published position papers and appeared before legislative hearings to promote strong child nutrition programs (Position Paper on Child Nutrition, 1974). A National Nutrition Policy was considered for the purpose of assuring every American an adequate diet (Mayer, 1973).

1. *Development of EFNEP*

The objective of the Expanded Food and Nutrition Education Program is to help families (Guide for EFNEP, 1974, p. 1), "especially those with young children living in poverty or near poverty, to acquire knowledge, skills, and changed behavior neces-

sary to achieve adequate diets in normal nutrition." To meet this objective, the goals of the Program specified guiding its clientele toward (Guide for EFNEP, 1974, p. 2):

1. Improved diets and health for the total family, including young children (infants and preschoolers), school-age children and teenagers, pregnant women.
2. Increased knowledge of the essentials of nutrition.
3. Increased ability to select and buy food that satisfies nutrition needs.
4. Increased ability to prepare and serve palatable meals.
5. Improved practices in food storage, safety, and sanitation.
6. Increased ability to manage resources that relate to food, including food stamps.
7. Increased participation in the food assistance programs.

The EFNEP was implemented in January, 1969, in a number of counties in each of the 50 states. Funds were allocated proportionate to the state's number of low-income families. The primary objective was improvement of family diets. Other aspects of family nutrition-related needs were to be considered to enable the homemaker to concentrate upon the family's dietary needs.

2. *Youth Phase of EFNEP and the Nutrition Lesson Series*

The Youth Phase of EFNEP received emphasis in fiscal year 1970 when Congress approved appropriations for expanding EFNEP youth activities in depressed city areas. In that year, the USDA received approval of a budget request for $30 million to continue EFNEP. Seven and one-half million of the funds were to provide professional staff to work with low-income urban youth in 4-H type program activities. Although indigenous aides were to continue working with the adult phase of the program, volunteers were to be utilized with the youth phase as much as possible. Volunteers, with assistance from aides and professionals, were to establish EFNEP youth groups and to involve them in nutrition-related activities. Due to the apparent success of the total program in reaching low-income clientele, Congress appropriated $50 million for EFNEP in 1971.

The objective of the 4-H Phase of EFNEP was to provide nutrition education programs for disadvantaged youth located primarily in depressed areas. The principal goals of the youth phase were to (The EFNEP, 1974, p. 9):

1. Provide education for youth in principles of nutrition and diets, and in the acquisition and use of foods;

2. Contribute to the personal development of disadvantaged urban youth through improved nutrition; and
3. Contribute to improvement of diets and nutrition of families through education programs for youth.

The effective implementation of such a program required nutrition education materials that would be integrated and properly sequenced, using instructional strategies and methods suitable for low-income youth, ages 8 through 12.

In December, 1971, the Extension Service officially recognized the need within the states for factual nutrition education materials, in quantity, for use with low-income youth, ages 8 through 12, enrolled in EFNEP projects. A task force group comprised of Extension personnel in 4-H and Home Economics met in Washington, D. C., to review the objectives of youth work through EFNEP; to review the kinds and quality of teaching materials in nutrition already being used in the states; and to consider the advisability of nutrition education materials being made available for purchase from a central source. The task force recommended that the Extension Service develop a series of nutrition lessons specifically designed for the interest and entry levels of 8 through 12-year-old youth. The series was to include 10 predetermined nutrition topics to provide both youth and leader materials. The Youth Nutrition Lesson Series was developed in 1972 by Mary Jean Baker in collaboration with Evelyn Johnson, Fern Kelly, and Jean Brand, with consultation and field testing by the aforementioned task force.

Topics of the lessons in the Youth Nutrition Lesson Series include: (1) Super Snacks, (2) Mighty Milk, (3) Vitamin C for You and Me, (4) Meet the Meat Group, (5) Bring in Breads and Cereals, (6) Eat Your Way to Vitamin A, (7) Milky Ways, (8) Meat and More, (9) Amazing Ways with Grains, and (10) Get It All Together. Every lesson includes carefully defined nutritional objectives and personal objectives for the age group of EFNEP youth. The Lessons have been assumed to achieve the general objectives for the EFNEP 4-H Youth phase.

The Lesson Series provides many food preparation experiences, as well as recreational activities related to food, designed to stimulate the child's interest and motivate him to gain a better understanding of the principles of nutrition for himself and his family. The leader's guide for each lesson assists the "teacher" in utilizing accessible materials and human resources in planning meaningful teaching/learning environments for the youth (Guide for EFNEP, 1974).

3. *Purposes and Objectives of the Research Project*

The purposes of the research project were to: (1) assess the effectiveness of Lessons 1 through 6 of the Lesson Series in producing nutrition behavior change in disadvantaged youth, ages 8 through 12, who were taught the lessons and (2) determine the relationship of selected factors (i.e., learner characteristics, family characteristics, teacher characteristics, and teaching/learning environment factors) to the degree of nutrition behavior change effected in the learners.

Specific objectives were to:

1. Formulate a profile of the youth participants and their families based on selected characteristics.

2. Determine the nutrition behavior change that occurred in the youth participants during the experiment. Behavioral change included changes in nutrition knowledge and attitude, as well as food intake patterns.

3. Determine the relationship between selected youth and family characteristics and the nutrition behavior change effected in the youth taught the Lesson Series. Selected youth characteristics were: age, sex, grade in school, place of residence (rural/urban), and participation in school food programs. Selected family characteristics were: income, number of children in family, age of homemaker, level of formal education of head-of-household, occupation of head-of-household, and participation of homemaker in EFNEP.

4. Formulate a profile of teachers based on type of teacher and selected characteristics.

5. Determine the relationship of selected teacher characteristics to the nutrition behavior change in the youth they taught. These characteristics were: type of teacher, age, sex, education, income, and socioeconomic status (income/education levels).

6. Determine the relationship of certain factors in the teaching/learning environment to the nutrition behavior change effected in the learners. The teaching/learning environment factors were: group size, teaching/learning setting, lesson time frame, lesson frequency, and teaching strategies.

7. Compile the teachers' evaluation of the lessons, the suggested teaching strategies, objectives met, and their perception of the youth's actions in and reactions to the lessons taught.

4. *Conceptual Framework*

The theoretical consideration upon which this evaluative study was based was that of assessing the effectiveness of the Youth

Nutrition Lesson Series in bringing about nutrition behavior change in disadvantaged youth taught Lessons 1 through 6 of the Series. Indicators of the effectiveness of the Lesson Series were defined as change in the youth's nutrition knowledge, attitude, and food intake patterns through participation in an experimental teaching/learning situation.

A schematic representation of the conceptual framework for the overall evaluative study of the Youth Nutrition Lesson Series is shown in Figure 1. The macro objective of the study is depicted as assessing the effectiveness of the Youth Nutrition Lesson Series in effecting nutrition behavior change in disadvantaged youth, ages 8 through 12, by teaching them the first six lessons of the 10-lesson series. The treatment was administered in either an Extension setting (informal) or school setting (formal). The schema serves as a guide for assessing the disadvantaged learner's progress in changing nutrition behavior (nutrition knowledge, attitude, and food intake) in two types of teaching/learning settings. The Series was designed to be taught in the small, informal, Extension type group setting represented by Group I in the project. For purposes of comparison, youth also were taught in a second experimental group (Group II) which was larger in size and in the more formal classroom type setting. For further comparative purposes, a control group was established in a classroom or other formal setting.

As depicted in Figure 1, formative evaluation was utilized in the study by measuring the nutrition behavior change in the learner that might be attributed to teaching him the first six lessons in the Lesson Series. The change, or learning, that occurred was established by pretesting for entry level, providing the learning activity by teaching him the Lesson Series, and posttesting to establish his exit level. The degree of nutrition behavior change resulting from being taught the Lesson Series, as measured by the difference in mean pretest/posttest scores, was determined for the three components of nutrition behavior: (1) nutrition knowledge (cognitive behavior), (2) nutrition attitude (affective behavior), and (3) food intake—with regard to nutrition concepts, values, and skills included in Lessons 1 through 6 of the Series.

The conceptual framework undergirding the study was discerned from the disciplines of psychology, social psychology, sociology, and education. It has its genesis in the teaching/learning transaction. An exploration into the literature on teaching/learning revealed that it is a construct that embraces four interrelated macro concepts, namely: (1) the learner (disadvantaged youth), (2) the teacher (type—aide, volunteer, classroom—and characteristics), (3) the teaching/learning environment (group size, setting, lesson time frame, lesson frequency, and teaching

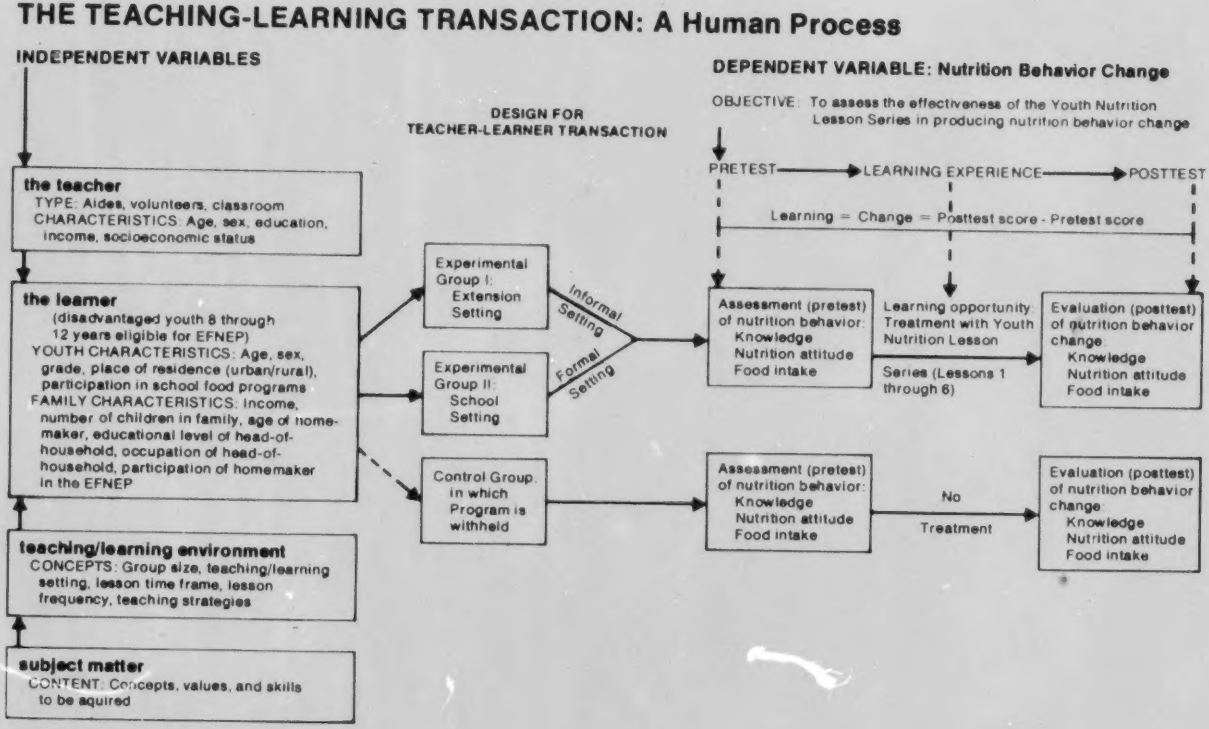
THE TEACHING-LEARNING TRANSACTION: A Human Process
INDEPENDENT VARIABLES
DESIGN FOR TEACHER-LEARNER TRANSACTION
DEPENDENT VARIABLE: Nutrition Behavior Change
OBJECTIVE: To assess the effectiveness of the Youth Nutrition Lesson Series in producing nutrition behavior change
the teacher
TYPE: Aides, volunteers, classroom
CHARACTERISTICS: Age, sex, education, income, socioeconomic status
the learner
(disadvantaged youth 8 through 12 years eligible for EFNEP)
YOUTH CHARACTERISTICS: Age, sex, grade, place of residence (urban/rural), participation in school food programs
FAMILY CHARACTERISTICS: Income, number of children in family, age of homemaker, educational level of head-of-household, occupation of head-of-household, participation of homemaker in the EFNEP
teaching/learning environment
CONCEPTS: Group size, teaching/learning setting, lesson time frame, lesson frequency, teaching strategies
subject matter
CONTENT: Concepts, values, and skills to be aquired
Experimental Group I: Extension Setting
Informal Setting
Experimental Group II: School Setting
Formal Setting
Control Group in which Program is withheld
PRETEST
LEARNING EXPERIENCE
POSTTEST
Learning = Change = Posttest score - Pretest score
Assessment (pretest) of nutrition behavior: Knowledge Nutrition attitude Food intake
Learning opportunity: Treatment with Youth Nutrition Lesson Series (Lessons 1 through 6)
Evaluation (posttest) of nutrition behavior change: Knowledge Nutrition attitude Food intake
Assessment (pretest) of nutrition behavior: Knowledge Nutrition attitude Food intake
No Treatment
Evaluation (posttest) of nutrition behavior change: Knowledge Nutrition attitude Food intake

Figure 1. Conceptual framework for the study of the effect of the Youth Nutrition Lesson Series on nutrition behavior change in disadvantaged youth

strategies), and (4) the subject matter or behavior change to be effected in the learner (nutrition knowledge, attitude, and food intake pattern/concepts, values, and skills to be acquired by the learner). Hence, the teaching/learning transaction and the four concepts encompassed therein were considered basic to the study's overall conceptual perspective.

Teaching/Learning Transaction

Based on current research and experiences with learning change processes, an effective teaching/learning process should be predicated on two basic assumptions, namely: (1) that the teaching/learning process is a human transaction that involves the learner, teacher, teaching/learning environment, and behavioral change or subject matter (concepts, skills, and values) to be acquired by the learner in a set of dynamic interrelationships and (2) that the target of education is change and growth in the individual and his behavior, and hence in his worlds. Encompassed within the second assumption is a deeper and broader goal than cognitive learning only. Each individual must continuously be at work reorganizing, remaking, and relating his internal and external worlds. Learning that remains only cognitive, and does not become part of the learner's internal system and external behavior, does not necessarily affect his behavior. There is a growing body of research that substantiates learning as an internal process and that the sense of discovery must come from within. Thus, the need to combine cognitive and affective characteristics of teacher and learners with factors in the teaching/learning environment becomes important in creating conditions necessary for effecting nutrition behavior change in disadvantaged youth. These two basic assumptions about the teaching/learning transaction provided the basis from which were generated the four macro concepts that undergirded the conceptual framework for this evaluative study. They indicate the importance of combining teaching procedures and understandings of attitudinal and cognitive characteristics of both learner and teacher with skills of working with learners and learning groups in creating environments conducive to learning and change.

The Learner: Disadvantaged Youth

The learners in this study were disadvantaged youth, ages 8 through 12 years. Hellmuth (1967, p. 21) defined a disadvantaged child as one "deprived of the same opportunity for healthy growth and development as is available to the mass majority of the other members of the larger society in which he lives." Because of his culture, his home environment, and his life style, the lower-class,

disadvantaged child enters school ill-equipped to meet the demands of the classroom. This learner's previous environments, exposures, and experiences make it difficult for him to become motivated. Such motivation can be accomplished only through providing a teaching/learning environment that is relevant to his culture and life style, and learning conditions that will stimulate him to learn.

The disadvantaged have been described as existing in a subculture to the dominant culture of the society. Their subculture fulfills three functions which tend to perpetuate the disadvantaged way of life (Johnson, 1970, p. 6):

> The subculture gives its members identification; . . . provides a patterned network of groups and institutions that allows an individual to confine his primary relations to his own ethnic group; and . . . reflects the dominant culture patterns of behavior and values through the prism of its own cultural heritage.

Hence, the disadvantaged's subculture and the dominant culture of society must interact so that the individual can adapt his behavior patterns and values to fit the latter as well as his own particular way of life.

Adler (1968, pp. 14-15) found that culturally disadvantaged children portray certain learning patterns; i.e.,

> (1) They tend to learn more readily by inductive rather than deductive approaches. . . . They need the support of an authoritarian figure in the classroom. (2) They are unaccustomed to insight building by external use of lectures and discussions at home. . . . (3) They need to see concrete application of what they learn and receive satisfaction from the learning. (4) They tend to have poor attention spans and consequently experience difficulty in following the teacher.

Disadvantaged youth have a unique background of experiences that must be recognized as adaptive strengths of these individuals, even though they are not the same experiences as those of youth in the more dominant culture. Youth and family sociocultural factors interact to produce this unique individual, all of which influence and affect the teaching-learning transaction.

Thus, the literature on the disadvantaged learner characterizes him as one with a limited experiential background that does not meet middle-class expectations, poor attention span, and low motivation, who is economically and/or culturally impoverished and linguistically handicapped, and whose conceptual development is limited. Therefore, certain sociocultural factors pertaining to the individual youth and his family may influence the degree of change that occurs in the components of nutrition behavior—nutrition knowledge, nutrition attitude, and food intake.

The Teacher

Craig (1971, p. 24) defined teaching as "a process of creating and arranging situations that stimulate and guide learning activities toward desirable goals." The teacher is the facilitator who guides the learning process and provides both the physical setting and emotional atmosphere that are conducive to learning. In this research, the teacher was defined as "a person (youth or adult) who teaches the Nutrition Lesson Series to youth." The type of teacher was a volunteer, aide, or classroom teacher. A primary concern of this investigation was the effect the person doing the teaching had on the nutrition behavior change that occurred in disadvantaged youth who were taught the Lesson Series.

The teacher, like the learner, brings to the teaching/learning situation far more than a knowledge of the subject matter. He brings a certain degree of awareness (or lack of it) that the teaching/learning process is a delicate human transaction that requires skill and sensitivity in human relations. The teacher's perceptual, emotional, attitudinal, and motivational systems and his awareness of them and their effect on learning and change are important forces in the teaching/learning transaction with disadvantaged youth.

A teacher's own background seems to have much to do with his attitude toward the disadvantaged learner (Gottlieb and Ramsey, 1967). If he himself has risen out of a lower-class environment, he is much more apt to take an understanding view of such learners. One means of providing indigenous teachers of disadvantaged youth is through the use of paraprofessional program aides and volunteers, who are used extensively in the Cooperative Extension Service. These aides and volunteers are trained and supervised by professional nutritionists or home economists to establish contact with the hard-to-reach, low-income family and to teach them nutrition principles (Spindler, 1967). This is particularly true in EFNEP, where aides and volunteers work quite successfully with both adult homemakers and youth.

The teacher of the disadvantaged learner must have certain attributes. This teacher must understand the characteristics of the disadvantaged including their environment, culture, background, life style, and learning difficulties. Providing learning experiences that both meet the learner's goals and involve him in the accompanying activities is extremely important. The teacher of the disadvantaged must exhibit a great deal of patience and understanding, and give personal attention to these students.

Just as certain learner and family sociocultural factors were expected to affect or be related to nutrition behavior change, so

too were certain teacher characteristics, i.e., type (volunteer, aide, classroom teacher), age, sex, education, income, and socioeconomic status. The teachers who participated in the research project represented all variations of the aforementioned characteristics.

Teaching/Learning Environment

The teaching/learning environment is the learning situation and atmosphere in which the learner is placed (Verner and Dawson, 1971). In this investigation the environment included the variables: (1) group size, (2) teaching/learning setting (informal and formal), (3) lesson time frame, (4) lesson frequency, and (5) teaching strategies. A primary objective of the study was to assess the effect that each of those five variables had on the nutrition behavior change that occurred in disadvantaged youth who were taught the Lesson Series. A brief discussion of each variable follows.

The learning group has a great influence on the teaching/learning transaction. Research in group dynamics has made available information that stresses the powerful forces present in groups which could measurably increase individual learning and change.

Bernard (1972) defined a group as a number of individuals bound together by some common factor(s) such as age, interest, purposes, or abilities. The number of learners in a teaching/learning situation may restrict the opportunity for individual learner interaction. Thus, the group size may be a factor that can either facilitate or impede the rate at which learning occurs. Group size in this study ranged from less than 10 youth to 16 or more. Olson (1971) found that smaller classes produced significantly higher criterion scores than large classes. Since smaller groups would maximize individual attention, the small group is thought to be particularly suited to the disadvantaged child.

The Nutrition Lesson Series was designed primarily to teach disadvantaged learners in certain settings. The lessons were designed to be taught in small, informal, Extension type groups that have kitchen facilities available so that group participation can be a major emphasis. The fact that the youth participate in food preparation activities and eat the food they prepare serves as motivation and as a satisfying achievement that should encourage them to adopt the new nutrition behavior. Since the home or community center can provide more opportunities for involvement in or participation by the youth in food preparation (Bernard, 1972), these were assumed to be the better places for teaching the Lesson Series. In this study, Group I was taught in the informal, Extension type setting. Experimental Group II was

taught in the more formal school or other organized setting, often with no kitchen facilities available and in larger group sizes than for Group I.

Olson (1971) found no significant differences in behavioral changes of elementary or secondary youth with relation to the time of day their class met, or the length of time the class met. The youth groups in the present study met for varying lengths of time, ranging from 45 minutes or less to over one hour.

Because of their limited self-esteem and low motivation, disadvantaged learners need constant reinforcement from their teachers (Tyler, 1963). Therefore, it was assumed that the more frequently the youth participants met to be taught the Lesson Series, the more reinforcement they would receive, and the more they would learn. However, teachers of disadvantaged youth need to remain cognizant of the fact that attendance in a learning group does not necessarily mean commitment to the process of learning and change. Experimentation and practice by the learner are important conditions in the total process of teaching/learning.

Teaching strategies that lend themselves to student participation seem to motivate and stimulate the disadvantaged learner and to result in greater behavioral change than experienced through other teaching strategies. Olson's (1971) findings concerning indicators of quality in the teaching/learning environment showed that the overall best predictor of quality is the educational activity itself. Those teaching strategies that score high in his study were small group participation, laboratory experiences, and demonstrations. Lectures and movies received the lowest scores.

Teaching the disadvantaged is not easy; there is obviously no special method guaranteed to succeed. Disadvantaged youth can benefit from a certain degree of structure, presumably to compensate for the lack of structure in their home environment (Mouly, 1973). These youth need a wide variety of experiences with objects as the basis for developing clear and stable concepts. Draper (1970) found that learning experiences for disadvantaged youth should meet practical needs, and that the most valuable study is independent study, which allows the student to learn at his own pace and pursue his own interests.

In this study, three types of teaching strategies are included in each lesson of the Series: reading, observation, and participation. The youth participants in the smaller groups (Group I) were expected to experience more participatory activities and demonstrations than were the larger groups (Group II).

The Subject Matter—Nutrition Lesson Series

The subject matter involved in this project was the Youth Nutrition Lesson Series consisting of 10 lessons designed by the Extension Service, USDA, specifically for disadvantaged youth, ages 8 through 12. Each lesson has defined behavioral objectives directed toward youth participants in the Youth Phase of EFNEP. During the early development of the Lesson Series, the task force group comprised of Extension personnel recommended that the nutrition content of the Lesson Series: (1) emphasize nutrition rather than recipes—teach how to eat rather than how to cook, (2) teach nutrition concepts, (3) include nutrition concepts developed according to maturity, experiences, and interests of learners, (4) focus on nutrients most apt to be deficient in diets of participants, and (5) include suggestions for supplemental nutrition experiences and lessons.

Experimental Groups I and II were taught Lessons 1 through 6 of the 10-Lesson Series in this evaluative study. The ultimate goal of the subject matter (Nutrition Lesson Series) in the teaching/learning transaction is that of bringing about planned behavior change in the learner (disadvantaged youth). Gifft *et al.* (1972, p. 258) defined planned change as "a deliberate effort to improve a set of conditions through intervention, whether the desire for help originated with the audience or is created by the change agent." Burton (1958, p. 242) defined learning as "a change in the learner, due to the interaction of that individual and his environment, which fills a need and makes him more capable of dealing adequately with his environment."

Nutrition behavior change may be classified into three domains: (1) cognitive behavior based on nutrition knowledge; (Bloom, 1956), (2) affective behavior based on attitudes, values, and beliefs (Krathwohl and Bloom, 1964); and (3) psychomotor or skills behavior in the application of knowledge to food practices (Johnson and Johnson, 1970). In the present research, the concern was with learning that takes place as a change in nutrition behavior primarily in the cognitive and affective domains as the result of being taught the subject matter in the first six lessons of the Youth Nutrition Lesson Series.

Hence, the foregoing formulations served as the bases from which were generated the objectives to guide the study. In addition, the four concepts—the learner, the teacher, the teaching/learning environment, and the subject matter—served as the foundation from which was generated the study's design.

5. *Limitations*

Several factors were considered as limitations for this research project.

1. The findings and conclusions are limited in application to those youth groups selected to participate in the study. Their application to other EFNEP youth groups would be inadvisable.

2. The Extension service in each state is autonomous. Therefore, the selection of Extension personnel and/or volunteers and classroom teachers to participate in the project rested with the individual State Coordinator for the project. Adaptation of the target population depended upon each state's ability to identify youth groups to participate. Unique problems in communication, supervision, and coordination of the study were experienced due to the broad geographical separation of the states involved (Minnesota, North Carolina, Oklahoma, and Vermont). The ultimate decision about procedures to be used in conducting the study rested with the respective state. Therefore, data generated from the survey lacked uniformity both among and between the four states. For example, (1) Vermont had no Group II; (2) information on only two sociocultural characteristics of youth's families was available from Minnesota—number of children in family and ethnic background of family; (3) no volunteers taught in North Carolina; (4) no classroom teachers were utilized as teachers in Minnesota, Oklahoma, and Vermont; (5) all Group II youth in Minnesota were taught by high school volunteers who were 18 years of age or less, were assumed to be from families in the lower income level, and were in the one-three years of high school educational level; (6) all Oklahoma youth were taught the lessons twice a week; (7) only 9 of the 110 teachers were males, 8 of whom taught Group II youth in Minnesota; and (8) with the exception of one Oklahoma teacher, only Minnesota had teachers who were 18 years of age or less.

3. Socioeconomic and family data were difficult to obtain from the youth. The Education Amendments of 1974 (the Buckley Amendment) and the Family Education Right and Privacy Act of 1974 (effective November 19, 1974) require parental or family permission to collect personal data on youth's family and their socioeconomic status. To collect such information for the project, Extension personnel would have been required to obtain permission from each family represented. The time and expense involved were prohibitive.

4. The Lesson Series was planned to be utilized with small groups of 6 to 10 youth, with facilities available for youth participation in food preparation. Such participatory learning was considered important to disadvantaged youth. Due to the Group

II setting, the lack of food preparation facilities in some cases may have limited the degree of nutrition behavior change that occurred in those youth.

5. The suggested time frame to conduct the research project was six weeks in which to pretest, teach, and posttest the participants. This relatively short time frame may have limited the degree of nutrition behavior change that occurred in Experimental Groups I and II.

6. Since the pretest may have sensitized the control group to environmental references to nutrition, the use of a parallel test might have been a better choice in post-testing. However, time limitations and cost involved in developing an additional test, plus the need to pilot test the instruments already developed, precluded that choice.

B. *Methodology*

An evaluative research design was utilized in this study to determine the effectiveness of the EFNEP Lesson Series (independent variable) in bringing about nutrition behavior change (dependent variable). The nutrition behavior change that occurred was measured using Popham's pretest, posttest, control group design as illustrated in Figure 2 (Lovett *et al.*, 1970, p. 81). Questionnaires were used to determine the changes in nutrition knowledge, attitude, and food intake that occurred in the participants during the study.

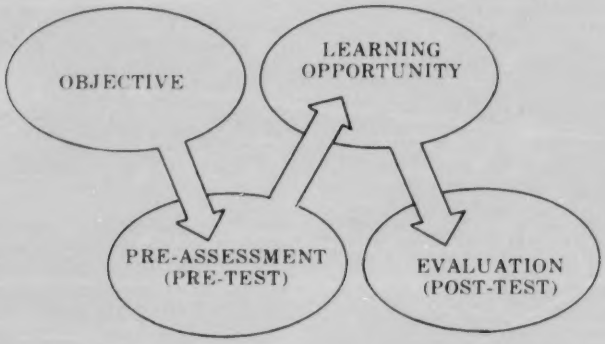

Figure 2. The instructional model

1. *Research Design*

An adaptation of Greenberg and Mattison's research model, as illustrated in Figure 3 (Suchman, 1973, p. 92), was used as the

basic design for this study. Modifications of the Greenberg-Mattison design were made in the EFNEP Research Study to assess the effectiveness of the Lesson Series as diagrammed in Figure 1.

2. *Population and Sample*

The target population for the study was confined to youth who were eligible for the 4-H Youth phase of EFNEP. Eligible youth were defined as (Guide to EFNEP, 1974, p. 31):

> . . . 4-H age, low-income disadvantaged youth primarily in depressed city areas having any or all of the following characteristics:
> . . . Youth 4-H ages from EFNEP families [8 through 12 for this study].
> . . . Youth living in "low-income" geographic areas.
> . . . Youth living in depressed areas of cities.
> . . . Youth on "free or reduced school lunch" programs.
> . . . Youth from families receiving Aid to Dependent Children.
> . . . Youth participating in other programs reaching low-income youth.

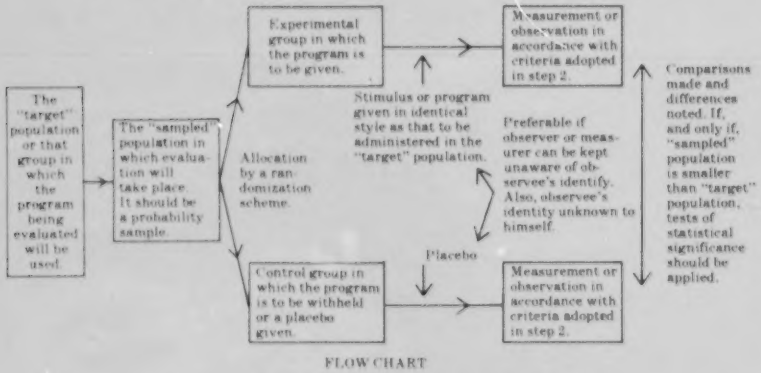
The "target" population or that group in which the program being evaluated will be used.
The "sampled" population in which evaluation will take place. It should be a probability sample.
Allocation by a randomization scheme.
Experimental group in which the program is to be given.
Stimulus or program given in identical style as that to be administered in the "target" population.
Measurement or observation in accordance with criteria adopted in step 2.
Preferable if observer or measurer can be kept unaware of observee's identify. Also, observee's identity unknown to himself.
Placebo
Control group in which the program is to be withheld or a placebo given.
Measurement or observation in accordance with criteria adopted in step 2.
Comparisons made and differences noted. If, and only if, "sampled" population is smaller than "target" population, tests of statistical significance should be applied.
FLOW CHART

Figure 3. Model for evaluating a health program

In addition, the youth selected to participate were to be without previous exposure to the Nutrition Lesson Series.

For purposes of this study two experimental groups and a control group were established within each participating state, except Vermont. These samples, made up of youth who were eligible for the 4-H EFNEP and had not been exposed to the Lesson Series, were selected by each state. To avoid sample contamination the groups of youth (Experimental Groups I and II and control) were to be geographically separated by selecting

each group from a different county or region of the state. In large urban areas, definitely low socioeconomic areas or schools were utilized in all instances. Table 1 presents the number of groups that participated in the study, by state and group classification.

Table 1. Number of groups that participated in the research project, by state and group classification

State	Group classification			Total
	Group I	Group II	Control	
Minnesota	19	16	6	41
North Carolina	21	10	6	37
Oklahoma	16	6	7	29
Vermont	13	0	[1]	13
Total	69	32	19	120

[1] Control group handled on an individual or family basis, not by group.

A total of 1368 youth, ages 8 through 12, from the states of Minnesota, North Carolina, Oklahoma, and Vermont fulfilled the previously noted requirements to be included in the study. The data in Table 2 show a total of 422 youth participants in Minnesota, 368 in North Carolina, 377 in Oklahoma, and 201 in Vermont. Each state, except Vermont, established two experimental groups and one control group. Vermont had only one experimental group—Group I—and no formal control group. Of the 1368 youth who participated in the study, 36.0 percent were in Group I, 29.1 percent in Group II, and 34.9 percent in the control group.

Table 2. Distribution of youth participants, by state and group[1]

State	Experimental group				Control		Total	
	I		II					
	N	%	N	%	N	%	N	%
Minnesota	126	9.2	147	10.7	149	10.9	422	30.8
North Carolina	129	9.4	130	9.5	109	8.0	368	26.9
Oklahoma	131	9.6	122	8.9	124	9.1	377	27.6
Vermont	106	7.8	0	0.0	95	6.9	201	14.7
Total	492	36.0	399	29.1	477	34.9	1368	100.0

[1] All percentages based on a total of 1368 youth.

The 492 Group I youth were taught in small groups by a volunteer or aide in an informal, Extension type setting. In 53 percent of the cases, the size of group was typically 6 to 10 youth. The remainder were in group sizes of 11-15 youth. Kitchen facilities were available whenever possible.

The 399 Group II youth were taught by volunteers, aides, or classroom teachers in classrooms, housing projects, or other organized community group settings. The size of these groups ranged from less than 10 to 16 or more youth. Although recommended, food preparation activities were not always possible in those settings.

The 477 control group youth were in a classroom or organized community group setting. Size of group was similar to that of Group II. The control groups were not exposed to the Lesson Series, but were administered the pretest/posttest at the beginning and end, respectively, of the time period for the study.

3. *Instrumentation and Data Collection*

Structured questionnaires were designed and used to obtain data regarding (1) the youth and their families, (2) volunteers, (3) aides, (4) home economists or Extension professionals, and (5) classroom teachers involved in the total research project. A description of the questionnaires follows.

Youth Questionnaires

Youth data were obtained through pretest/posttest instruments in booklet form. The two booklets were entitled: (1) *Youth Booklet for Expanded Food and Nutrition Education Program Evaluation Study: Pretest Questionnaires* and (2) *Youth Booklet for Expanded Food and Nutrition Education Program Evaluation Study: Posttest Questionnaires*. The pretest booklet included four sections: Nutrition Knowledge questionnaire, Nutrition Attitudes and Practices questionnaire, Food Intake Record for Youth, and Personal Data on the Youth's Family form. The posttest booklet was identical except that the fourth section, Personal Data on the Youth's Family, was omitted.

The purpose of the pretest and the posttest was to assess the change in nutrition behavior for all groups of participants at the end of the study period. Since the control group was not taught the Lesson Series, any change in those youth was attributed to environmental factors and maturation. A schema for assessing nutrition behavior change is diagrammed in Figure 4.

The Nutrition Knowledge Questionnaire was a pictorial test developed to meet the behavioral objectives and/or content of the Lesson Series. The foods included in the Lesson Series and the wording of the Series were adhered to in constructing the questions. Only those foods that would be familiar to children with limited food experiences or from certain ethnic or regional groups were included in the pictorial representations. The sketches of the food were in black and white, which might mean that they

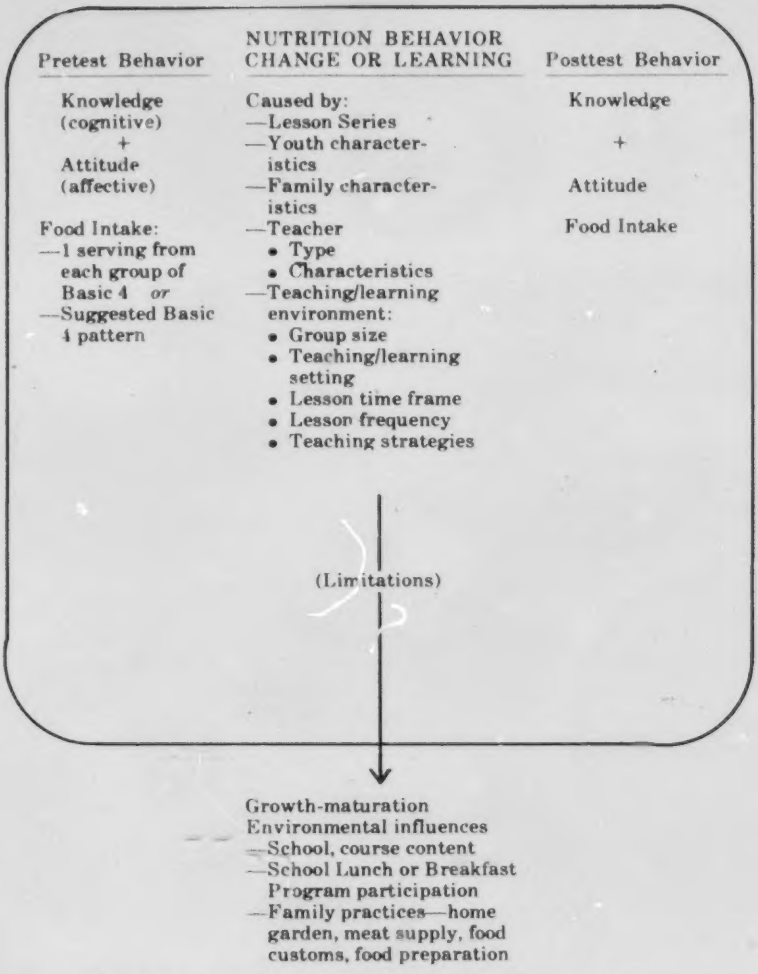

Figure 4. A schema for assessing nutrition behavior change.

were visualized differently than intended (Ombwara, 1972). The foods were labeled so the "teacher" could tell a child what the food was, if a question arose. However, during the pretesting of the questionnaire, the youth stated that they could identify the pictures without the labels being read.

The questions in the Youth Booklets were read to each youth group, and reread if necessary. Adequate time was allowed for each youth in the group to check the proper answer(s). Reading the questions to the youth was to assist any who had difficulty in reading, were unfamiliar with food and nutrition concepts, or were physiologically fatigued and unable to "pay attention."

The Nutrition Attitudes and Practices section contained items that for the most part required "Yes" or "No" responses or single-response answers. The statements in this section also were read to the youth and adequate time was allowed for each to indicate how he felt or what he did in practice. The self-concept and school attitude items were included in this section of the booklet. However, because of the previously mentioned Buckley Amendment, data received on self-concept and school attitude were too limited to effect comparisons among the study population. For this reason, the variables were discarded.

The Food Intake form (a 24-hour food intake inventory) was completed in a manner determined by the teacher. Most youth remembered what they had eaten, but had difficulty in writing it down because of the spelling involved. Many of the teachers chose to incorporate the inventory into the total study as a learning experience for the youth.

Information requested on the Personal Data on Youth's Family form was practically impossible to obtain from youth of the ages involved in the project. Therefore, it was recommended that, wherever possible, the teacher should take the information from records already available. In the case of EFNEP families, the Family Record form contained most of the requested information. Teachers were to use the method that would best enable them to obtain these data. The information requested was: income, number of children in family, age of homemaker, level of formal education and occupation of head-of-household, ethnic background, and homemaker's participation in EFNEP.

Pretesting the Youth Questionnaire

During the development of the youth questionnaires, the sections on nutrition knowledge and attitudes were pretested with EFNEP youth in North Carolina. The pretesting led to the recommendation that the Youth's Family Data and the Food Intake forms might need to be filled in by the administrator of the questionnaire. Major revisions of the section(s) tested were made after each pretest. The nutrition knowledge section was pretested six times; the attitude section, four times; and the other sections, three times.

Validity and Reliability

The behavioral objectives outlined by the Extension Service for the Lesson Series formed the basis for framing the pictorial questions on nutrition knowledge. The "content validity" or sampling adequacy of the questions was checked by North Carolina Extension Service nutritionists and other home economists who work with nutrition programs and/or with 4-H Youth or EFNEP. These staff members evaluated the questionnaire periodically during its development and participated in the final analysis on content validity. In this final analysis, each panel member was given a list of behavioral objective/content for each of the six lessons taught and the corresponding pictorial question(s). Using a scale of 1 to 5, the panel ranked each question on its content validity. A minimum score of 4 was required for a question to be retained in the test. This meant that the content of the question was considered to be appropriate or fairly appropriate to assess the behavioral objective and/or content of the lesson. The mean rank of individual questions ranged from 4.17 to 5.00. The overall mean rank for the 34 questions was 4.82. None of the questions presented to the panel had to be discarded.

The test-retest method was used to measure the reliability of the Nutrition Knowledge and Nutrition Attitudes and Practices questionnaires. The questionnaires were administered to a fifth-grade class of 29 youth, of which 22 completed both the test and the retest, which was administered to the same class about five days later. The two sets of test scores were correlated using the Kuder-Richardson formula 20 for estimating reliability (Guilford, 1965, p. 459):

$$r_{tt} = \left(\frac{n}{n-1}\right)\left(\frac{\sigma_t^2 - \Sigma pq}{\sigma_t^2}\right)$$

where n = number of items on the test; p = proportion passing an item (or responding in some specified manner); q = 1-p; σ_t^2 = variance; and pq = sum of variances of all items. A high reliability coefficient or "coefficient of stability" (Guilford, 1965, p. 446) would indicate that the children tested maintained approximately the same rank each time. A low reliability coefficient would mean the students changed rank appreciably. The

reliability coefficients obtained were .698 for the Nutrition Knowledge questionnaire, .775 for the Nutrition Attitudes and Practices questionnaire, and .837 for the combined Nutrition Knowledge and Nutrition Attitudes and Practices questionnaires.

Other Forms Utilized in Data Collection

Aside from the youth questionnaire forms, one other form was pertinent to obtaining information on the youth participants. This was the Attendance Record form which was filled in by the "teacher" (volunteer, aide, or classroom teacher) at each meeting. To be considered as completing the study, Groups I and II youth were to take the pretest, attend at least five of the six lessons, and take the posttest. The youth in the control group were to take only the pretest and the posttest and were not to be exposed to the Lesson Series during the period of the study. The Attendance Record form was used to determine those youth who fulfilled the requirements for completion of the study. Data on those youth who did not fulfill the requirements were discarded.

The change in nutrition behavior that could be attributed to certain teacher characteristics; factors in the teaching/learning environment; and the teachers' evaluation of the lessons and the suggested teaching strategies, and their perception of the youth's actions in and reaction to the lessons taught, were the thrust of the remainder of the overall study. Instruments used to obtain these data were:

1. Personal Data Questionnaire: The purpose of this form was to give a profile of the personnel involved in the study, *i.e.*, all volunteers, aides, classroom teachers, and Extension professionals.
2. Description of Training for the Study: The purpose of this form was to determine the type of training given personnel involved in the project. The form was filled in by all participating volunteers, aides, and classroom teachers.
3. Home Economist's or Extension Professional's Questionnaire: Information sought on this form concerned the training sessions for the county staffs, as well as the number of volunteers and aides in each county who were involved in the study. The form was filled in by the Extension professionals in charge of the study at both county and state levels.
4. Lesson Evaluation form: This form provided information about the objectives met, the suggested teaching strategies, and the teachers' perception of the youth's actions in and reactions to the lessons taught. This form was filled in by the teacher for each lesson completed.

4. *Personnel Involved in the Study*

As mentioned earlier, Extension Service, USDA, selected four states to participate in the research project. Each state selected personnel to fill the participating roles. These roles were: state Extension coordinators, Extension home economists or professionals, volunteers, aides, and classroom teachers. Table 3 shows the number of teaching and nonteaching volunteers, aides, and classroom teachers who were involved in each state.

A total of 110 volunteers, aides, and classroom teachers were in the teacher role. Minnesota had only volunteers and aides in the teacher role, the majority (75.6 percent) being volunteers. The same was true of Vermont, except here the majority (55.6 percent) were aides. Of the 15 "teachers" in North Carolina, 66.7 percent were aides; the remainder were classroom teachers. In Oklahoma 63.9 percent were aides and the remainder were volunteers.

Table 3. Teaching and nonteaching personnel involved in the study[1]

Status	Volunteer		Aide		Classroom teacher		Total	
	N	%	N	%	N	%	N	%
Minnesota								
Teaching	31	75.6	10	24.4	0	0.0	41	87.2
Nonteaching	0	0.0	0	0.0	6	100.0	6	12.8
Total	31	66.0	10	21.3	6	12.7	47	100.0
North Carolina								
Teaching	0	0.0	10	66.7	5	33.3	15	34.1
Nonteaching	19	65.6	6	20.7	4	13.8	29	65.9
Total	19	43.2	16	36.4	9	20.4	44	100.0
Oklahoma								
Teaching	13	36.1	23	63.9	0	0.0	36	50.7
Nonteaching	14	40.0	12	34.3	9	25.7	35	49.3
Total	27	37.9	35	49.3	9	12.8	71	100.0
Vermont								
Teaching	8	44.4	10	55.6	0	0.0	18	75.0
Nonteaching	1	16.7	5	83.3	0	0.0	6	25.0
Total	9	37.5	15	62.5	0	0.0	24	100.0
Combined								
Teaching	52	47.2	53	48.2	5	4.5	110	59.1
Nonteaching	34	44.7	23	30.3	19	25.0	76	40.9
Total	86	46.2	76	40.9	24	12.9	186	100.0

[1] Includes only those from whom properly executed forms were received.

Seventy-six persons were in the nonteaching role as either assistants or in charge of the control group. Among these, 44.7 percent were volunteers, 30.3 percent were aides, and 25 percent were classroom teachers.

The North Carolina Research Team developed the research proposal; conducted one-day training sessions for each state Extension staff involved in the project; developed and distributed the research instruments; collected, processed, and interpreted the data from the participating states; and prepared the project report.

Two members of the North Carolina Research Team, Margaret A. James and Martha R. Johnson, developed a *Manual for the Conduct of the Study* (1974) for use in training Extension personnel to conduct the research project and as a general reference. The Manual contains detailed information to be used as guidelines concerning the general responsibilities and roles of the personnel involved in the conduct of the study in each of the states. Each questionnaire or form and corresponding instructions for its administration were included in the Manual's Appendix.

5. *Data Analysis*

The research instrument used in this project was designed to allow for a quantitative measure of the responses regarding the youth's nutrition knowledge, nutrition attitudes, and food intake; and the independent variables studied.

During the editing of the returned instruments, those in which data were grossly incomplete or improperly filled in were eliminated. In addition, those instruments were voided for youth in all groups who did not complete both pretest and posttest.

Processing of data and the statistical procedures were carried out at the Triangle Universities Computer Center using the Statistical Analysis System (SAS). The first procedure was screening to identify the target population as low-income or disadvantaged through the use of family income, size of family, and occupation of head-of-household. Data obtained from youth who could not be identified as low-income or disadvantaged were eliminated.

Data analysis to meet the objectives of the study involved seven stages: (1) identification of youth and youth's family characteristics; (2) assessment of nutrition behavior change that occurred; (3) determination of possible relationships between youth and family characteristics and the nutrition behavior change that occurred in the learner; (4) identification of teacher characteristics; (5) determination of relationships between teacher characteristics and the nutrition behavior change that occurred in the youth they taught; (6) determination of relationships between

nutrition behavior change and factors in the teaching/learning environment; and (7) compilation of teaching strategies and lesson evaluations made by the teachers.

The plan for data collection in this study is analogous to a sampling scheme that produced three random samples of disadvantaged youth from each of four states. These random samples produced three distinct groups in each of the states: Experimental Group I (informal setting), Experimental Group II (formal setting), and a control group. Additional variables associated with the youth and with their families were thus a consequence of the original selection of the youth. Further, the factors associated with teacher characteristics and factors in the teaching/learning environment were a part of the study but were not a part of the original randomization of youth to the experimental groups. The evaluation of these factors and their interactions upon the change in nutritional behavior among the youth presented difficulties in making inferences because of the general lack of balance among these factors.

The basic procedure used was a general least squares analysis which produced an analysis of variance by accounting first for the basic design factors, states and groups, then considering the youth, family, teacher, and teaching/learning environment only after adjustment for the design factors. The comparisons of interest then were judged as to importance using the pooled standard deviation obtained from the analysis of variance by computing the appropriate standard errors for the desired contrasts.

In every case there existed missing classifications, *e.g.*, Vermont had no Group II, Oklahoma had no small classes, Vermont had no blacks, etc. The presence of these "missing cells" in multiway tables precludes any use of this partial information in adjusting any factor for the presence or absence of other cross-classifying factors. In statistical jargon, the interactions are "inestimable," and any attempt to perform mechanically the desired adjustments would have been arbitrary and even capricious. As a result the interpretations of the effects of the teaching/learning environment and concomitant factors on the dependent variables were made from the relevant means, along with the estimated error from which the effects of the factors were removed insofar as possible. Admittedly, under such circumstances, what comparisons or contrasts are deemed reasonable by one may be regarded as unreasonable by another. Statistical considerations provide guidelines for adjudicating the question, but knowledge and understanding of the subject matter are the final arbiters.

Youth and Family Characteristics

Youth characteristics of age, sex, grade in school, place of residence (rural/urban), and participation in school food programs; and their family characteristics of income, number of children in family, age of homemaker, level of formal education of head-of-household, ethnic background, occupation of head-of-household, and homemaker's participation in EFNEP were collapsed into categories so that they could be treated statistically. Frequency distributions were used to describe those characteristics within each state. Since family data other than number of children in family and ethnic background of family were unavailable from Minnesota, a "no response" category was utilized in those tables. Data concerning participation of youth in the school food programs also varied—not all respondents participated in either program, and some participated in both programs. For these reasons, only the frequency count and its percentage of the total youth participants within a state were used.

Nutrition Behavior Change

A major objective of the study was to determine the nutrition behavior change that occurred in the disadvantaged learner and what part of the change was attributable to being taught Lessons 1 through 6 of the Lesson Series on the basis of topics and behavioral objectives. The topics of the six lessons, using clusters of the individual behavioral objectives per lesson, were assessed as to change in nutrition knowledge (posttest score − pretest score = change). The significance of the changes in nutrition knowledge, attitudes, and food intake were assessed by testing differences between mean pretest/posttest scores.

Data for the control group were included to determine whether there was a significant difference between groups at the beginning of the study and if a significant nutrition behavior change occurred during the period of the study.

Relationship of Youth and Family Characteristics to Nutrition Behavior Change

Another objective of this study was to determine which of the sociocultural characteristics of the participating youth and his family were related to the nutrition behavior change that occurred.

A multiple regression for each variable was used to perform the analysis of variance (ANOVA) to establish F-values for the significance of the relationship between the dependent variable, change in nutrition behavior, and the independent variables, youth and family characteristics. A separate multiple regression

was performed for each independent variable due to the "no response" category items being removed from the analysis of data by the computer and the need to utilize to the maximum the information available about the youth and his family.

The original intent was to conduct an analysis of covariance with state and group, state by group being the major sources of variation and a number of learner attributes being covariables. Because of the unequal numbers of observations involved in the various group-by-state cells, it was deemed necessary to use a regression procedure to perform the analysis of variance. The regression procedure, however, automatically rejects observations for which values for any of the independent variables are missing or "no response." Thus, with a considerable number of missing observations which were fairly randomly distributed, most of the observations would have been automatically deleted had a complete multiple regression been run to include all independent variables. Instead, a number of separate multiple regressions were conducted which involved: state, group, state by group, and independent variable i, where i refers to one of the covariables, *e.g.*, youth's age.

To compare Group I within the four states and Group II within Minnesota, North Carolina, and Oklahoma, the analysis of variance F-value was used as the criterion for judging significant differences among the sets of means. If the F-value was significant, a t-test was made between pairs of means suggested by the interaction of the variable with state, group, and/or state by group indicated by the analysis (ANOVA).

A completely randomized experimental design with unequal number of individuals within groups was assumed when setting up the analysis of variance. The fact that some of the assumptions underlying the use of such a design were not met in this study is reflected in the term "quasi-experimental," which implies a superimposed treatment upon groups (rather than assigning treatments to groups completely at random). However, it would seem that the lack of random allocations of subjects to treatment groups would not greatly impair the results obtained.

Relationship of Teacher Characteristics to Nutrition Behavior Change

Sociocultural characteristics of the teacher thought to be related to the nutrition behavior change that occurred in the youth they taught were: type of teacher, sex, education, income, and socioeconomic status (income/education levels). The effect of each of these characteristics on nutrition behavior change was measured.

The annual income and educational level of the teacher were used to describe the socioeconomic status of the volunteers, aides,

and classroom teachers. Using the income identified in the EFNEP family record, income was collapsed into two categories, "lower" and "higher" income levels. The lower income level included annual income categories that were $6999 or less: $999 or less, $1000-2999, $3000-4999, and $5000-6999. The higher income level (which excluded EFNEP aides and volunteers) included annual income categories of $7000 or more: $7000-9999, $10,000-$11,999, $12,000-14,999, and $15,000 or more. Educational levels were collapsed in a like manner. The "lower" educational level teachers were high school graduates or less, and represented the three educational categories of eighth grade or less, one to three years of high school, and high school graduate. The "higher" educational level teachers had received education beyond high school to include the categories: one to three years of college, college graduate, and graduate work. The relationship of nutrition behavior change to teacher's socioeconomic level (income/education) was calculated within the four categories of higher/higher, higher/lower, lower/higher, and lower/lower to test for the effectiveness of the indigenous teacher versus the middle-class teacher.

Relationship of Teaching/Learning Environment Factors to Nutrition Behavior Change

Another objective of the study was to determine whether nutrition behavior change might be related to selected factors in the teaching/learning environment. A multiple regression for each variable was used to perform the analysis of variance (ANOVA) to establish F-values for the significance of the relationship between the dependent variable, change in nutrition behavior, and the independent variables, i.e., factors in the teaching/learning environment.

Due to differences in the treatment of the experimental groups within the four states, certain categories among the factors in the teaching/learning environment were not utilized. For example, all Oklahoma youth were taught the Lesson Series twice a week as compared to North Carolina youth who were taught the Lesson Series once to three or more times a week. For this reason, the categories were collapsed whenever feasible so that comparison of nutrition behavior change could be made within the groups and between states.

Factors in the teaching/learning environment were: size of group, teaching/learning setting, lesson time frame, lesson frequency, and teaching strategies. The effect of each of these factors on the nutrition behavior change that occurred in the learners was measured. Comparisons of nutrition behavior change that could

be attributed to teaching strategies could not be made. Consequently, teaching strategies were treated descriptively.

C. *Results*

This section presents the results of the research. Attention is focused on a profile of the youth participants and their families and of the teachers who taught the Lesson Series. The discussion then turns to interpreting the results of the data analyses in which were tested the relationships between nutrition behavior change in the youth and the selected study variables.

1. *A Profile of the Youth Participants*

Sociocultural characteristics used in generating a profile of the 1368 youth who participated in the research project were: age, sex, grade in school, place of residence (rural/urban), and participation in school food programs (Table 4). To participate in the study, the youth had to be 8 through 12 years of age when the pretest was given.

The distribution of the youth participants differed between the four states. Among the Minnesota youth, 62 percent were 10-11 years old, 59 percent were females, and 62.6 percent were in the fourth and fifth grades. All Minnesota youth lived in an urban area, and only about 40 percent participated in the School Lunch Program. The largest groups of North Carolina youth were 9-10 years old (49.8 percent), females (63 percent), and 39.2 percent were in the fourth grade. Rural and urban residents were equally represented (49.5 and 50.5 percent, respectively), and over 90 percent participated in the School Lunch Program. The largest number of Oklahoma youth were 10-11 years old (58.9 percent) and females (56.5 percent). Approximately 47 percent were in the fifth grade, 64 percent from rural areas, and over 91 percent participated in the School Lunch Program. The largest groups of Vermont youth (about 45 percent) were 11-12 years of age, females (60.2 percent), in the fifth and sixth grades (49.8 percent), and from urban areas (67.7 percent). About 64 percent participated in the School Lunch Program.

In general, one may say that the typical youth respondent in this research project was a 10-year-old female in the fourth or fifth grade who lived in an urban area and participated in the School Lunch Program.

2. *A Profile of the Youth Participants' Families*

This section describes the youth participants' families. Family characteristics that formed the basis for the description were: income, number of children in family, age of homemaker, level of formal education of head-of-household, ethnic background, occu-

Table 4. Frequency distribution of Group I, Group II, and control group youth, by state and sociocultural characteristics

Characteristic	Minnesota		North Carolina		Oklahoma		Vermont		Total	
	N	%	N	%	N	%	N	%	N	%
Age, yr:										
8	48	11.4	77	20.9	46	12.2	39	19.4	210	15.4
9	92	21.8	90	24.5	64	17.0	38	18.9	284	20.7
10	144	34.1	93	25.3	129	34.2	33	16.4	399	29.2
11	118	28.0	59	16.0	93	24.7	50	24.9	320	23.4
12	20	4.7	49	13.3	45	11.9	41	20.4	155	11.3
Total	422	100.0	368	100.0	377	100.0	201	100.0	1368	100.0
Sex:										
Male	173	41.0	136	37.0	164	43.5	80	39.8	553	40.4
Female	249	59.0	232	63.0	213	56.5	121	60.2	815	59.6
Total	422	100.0	368	100.0	377	100.0	201	100.0	1368	100.0
Grade in school:										
1	0	0.0	1	0.3	0	0.0	6	3.0	7	0.5
2	4	1.0	41	11.1	6	1.6	20	10.0	71	5.2
3	58	13.7	59	16.0	60	15.9	38	18.9	215	15.7
4	101	24.0	144	39.2	67	17.8	28	13.9	340	24.9
5	163	38.6	53	14.4	179	47.4	42	20.9	437	31.9
6	90	21.3	54	14.7	50	13.3	58	28.9	252	18.4
7	6	1.4	16	4.3	15	4.0	9	4.4	46	3.4
Total	422	100.0	368	100.0	377	100.0	201	100.0	1368	100.0
Place of residence:										
Rural	0	0.0	182	49.5	240	63.7	65	32.3	487	35.6
Urban	422	100.0	186	50.5	137	36.3	136	67.7	881	64.4
Total	422	100.0	368	100.0	377	100.0	201	100.0	1368	100.0
Participation in school food programs[1]:										
Breakfast	26	6.2	152	41.3	53	14.1	10	4.9	241	17.6
Lunch	167	39.6	333	90.5	345	91.5	129	64.2	974	71.2

[1] All respondents did not participate in a school food program and some participated in one or both.

pation of head-of-household, and homemaker's participation in EFNEP. The 1368 youth participants represented 1080 families, of which 32 percent were in Minnesota, 25.8 percent were in North Carolina, 29.8 percent in Oklahoma, and 12.4 percent in Vermont (Table 5). Only those data pertaining to number of children in family and ethnic background of family were available from Minnesota. Since some data were missing for all states, a "no response" category for each characteristic was included in Table 5.

Table 5. Frequency distribution of youth respondents' (Group I, Group II, and control) families, by state and sociolcultural characteristics (N = 1080 families)

Characteristic	Minnesota		North Carolina		Oklahoma		Vermont		Total	
	N	%	N	%	N	%	N	%	N	%
Income/month:										
$83 or less			19	6.8	3	0.9	0	0.0	22	3.0
$84-167			24	8.6	16	5.0	2	1.5	42	5.7
$168-250			50	18.0	31	9.6	6	4.5	87	11.9
$251-333			29	10.4	50	15.5	23	17.2	102	13.9
$334-417			73	26.3	56	17.4	43	32.1	172	23.4
$418 or more			72	25.9	161	50.0	58	43.2	291	39.6
No response			11	4.0	5	1.6	2	1.5	18	2.5
Total			278	100.0	322	100.0	134	100.0	734	100.0
Number of children in family:										
1	12	3.5	20	7.2	27	8.4	4	3.0	63	5.8
2	62	17.9	54	19.4	76	23.6	8	6.0	200	18.5
3	89	25.8	54	19.4	86	26.7	23	17.2	252	23.3
4	66	19.1	47	16.9	42	13.0	23	17.2	178	16.5
5	46	13.3	31	11.1	43	13.3	33	24.6	153	14.2
6	23	6.6	22	7.9	16	5.0	13	9.7	74	6.8
7	17	4.9	16	5.8	17	5.3	17	12.7	67	6.2
8	10	2.9	12	4.3	5	1.6	4	3.0	31	2.9
9	7	2.0	3	1.1	3	0.9	1	0.7	14	1.3
10	9	2.6	5	1.8	1	0.3	2	1.5	17	1.6
11 or more	5	1.4	6	2.2	0	0.0	3	2.2	14	1.3
No response	0	0.0	8	2.9	6	1.9	3	2.2	17	1.6
Total	346	100.0	278	100.0	322	100.0	134	100.0	1080	100.0
Age of homemaker, yr:										
10 or less			0	0.0	1	0.3	1	0.7	2	0.3
19-25			7	2.5	13	4.0	2	1.5	22	3.0
26-35			134	48.2	156	48.5	77	57.5	367	50.0
36-45			84	30.2	103	32.0	40	29.9	227	30.9
46 or more			42	15.1	42	13.0	14	10.4	98	13.4
No response			11	4.0	7	2.2	0	0.0	18	2.4
Total			278	100.0	322	100.0	134	100.0	734	100.0
Educational level of head-of-household:										
8th grade or less			96	34.5	45	14.0	47	35.1	188	25.6
1-3 yr high school			61	22.0	58	18.0	38	28.4	157	21.4
High school graduate			89	32.0	139	43.2	41	30.6	269	36.7
1-3 yr college or special training			15	5.4	36	11.2	5	3.7	56	7.6
4 yr college or more			2	0.7	32	9.9	0	0.0	34	4.6
No response			15	5.4	12	3.7	3	2.2	30	4.1
Total			278	100.0	322	100.0	134	100.0	734	100.0

(Continued on page 42)

Table 5 (Continued)

Characteristic	Minnesota		North Carolina		Oklahoma		Vermont		Total	
	N	%	N	%	N	%	N	%	N	%
Ethnic background:										
White	253	73.1	88	31.7	162	50.3	132	98.5	635	58.8
Black	65	18.8	185	66.5	132	41.0	2	1.5	384	35.6
Spanish surname	10	2.9	0	0.0	4	1.2	0	0.0	14	1.3
American Indian	1	0.3	4	1.4	15	4.7	0	0.0	20	1.8
Other	6	1.7	0	0.0	5	1.6	0	0.0	11	1.0
No response	11	3.2	1	0.4	4	1.2	0	0.0	16	1.5
Total	346	100.0	278	100.0	322	100.0	134	100.0	1080	100.0
Occupation of head-of-household[2]:										
A	[1]		6	2.1	17	5.2	2	1.5	25	3.4
B	[1]		10	3.6	16	5.0	4	3.0	30	4.1
C	[1]		18	6.5	25	7.8	5	3.7	48	6.5
D	[1]		42	15.1	57	17.7	20	14.9	119	16.2
E	[1]		16	5.8	16	5.0	2	1.5	34	4.6
F	[1]		44	15.8	46	14.3	14	10.4	104	14.2
G	[1]		62	22.3	74	23.0	26	19.4	162	22.0
H	[1]		6	2.2	3	0.9	1	0.7	10	1.4
I	[1]		8	2.9	2	0.6	0	0.0	10	1.4
Z	[1]		47	16.9	55	17.1	58	43.4	160	21.8
No response	[1]		19	6.8	11	3.4	2	1.5	32	4.4
Total			278	100.0	322	100.0	134	100.0	734	100.0
Homemaker's participation in the EFNEP:										
Yes	[1]		60	21.6	79	24.5	39	29.1	178	24.2
No	[1]		206	74.1	228	70.8	68	50.7	502	68.4
No response	[1]		12	4.3	15	4.7	27	20.2	54	7.4
Total			278	100.0	322	100.0	134	100.0	734	100.0

[1] Data not available from Minnesota.

[2] A = professional and technical workers; B = managerial workers, officials, and proprietors, except farm; C = clerical, sales, and kindred workers; D = craftsmen, foremen, and skilled workers; E = operatives and semiskilled workers; F = service workers, farm-owners, tenants, and managers; G = laborers, except farm and mine; H = farm laborers and foremen; I = members of Armed Forces; Z = "others"—retired or unemployed.

The income of approximately three-fifths (57.9 percent) of the North Carolina, Oklahoma, and Vermont families was $417 or less per month. Over half (50.8 percent) of the families in the four states had four or more children. Fifty percent of the North Carolina, Oklahoma, and Vermont homemakers were 26-35 years of age. Approximately 26 percent of the heads-of-household in those states had no more than an eighth-grade education, with an additional 21 percent having completed only part of high

school; nearly 37 percent were high school graduates. More than one-third (35.6 percent) of the families in the four states were black, the largest number (66.5 percent) of whom were in North Carolina and the smallest number (less than 2 percent) were in Vermont. Occupations of North Carolina, Oklahoma, and Vermont heads-of-household were represented in each of the occupation categories. Approximately one-fifth were nonfarm laborers and another one-fifth were retired or unemployed. The smallest numbers were farm laborers and members of the Armed Forces. Less than one-fourth of North Carolina, Oklahoma, and Vermont homemakers participated in EFNEP.

Family characteristics differed from state to state. Over half (52.8 percent) of the Minnesota families had four or more children, and 73 percent of the families were white.

Approximately 50 percent of North Carolina families had incomes of over $333/month, four or more children, and homemakers in the 26-35 age category. About 56 percent of the heads-of-household had less than a high school education, and 66.5 percent of the families were black.

Fifty percent of the Oklahoma families had incomes of $418 or more per month, 39.5 percent had four or more children, and 80.5 percent had homemakers in the 26-45 age range. Approximately 43 percent of the heads-of-household had completed high school, and 21 percent had some college training or were college graduates,. Half (50.3 percent) of the families were white, and 37 percent of the heads-of-household were service workers or nonfarm laborers.

Family income in Vermont was greater than $333/month for 75 percent of the families, 71.6 percent had four or more children, and 57.5 percent of the homemakers were in the 26-35 age category. About 64 percent of the heads-of-household had less than a high school education, and 98.5 percent of the families were white. A large number (43.4 percent) of Vermont heads-of-household were unemployed, disabled, or retired. The larger percentages of those employed were service workers/nonfarm laborers (30 percent) and craftsmen/skilled workers (15 percent).

3. *Nutrition Behavior Change*

A major objective of the research was to determine the degree of nutrition behavior change that occurred in the disadvantaged youth taught the first six lessons of the 10-lesson Youth Nutrition Lesson Series. The topics of the first six lessons, using clusters of the individual behavioral objectives per lesson, were assessed as to change in nutrition knowledge, attitude, and food intake in all three groups (Experimental Groups I and II and control).

Items in the nutrition knowledge test were clustered to determine the impact of each lesson upon knowledge change. The significance of the differences between mean pretest/posttest scores for each cluster was determined by group, including the control group which was not exposed to the Lesson Series.

The nutrition knowledge change in Group I youth was significant for all six topics and Summary—Basic 4 (Table 6). As compared to Group I, the change in Group II youth was less, but was significant for all topics except SNACKS. The only significant

Table 6. Nutrition knowledge change ($\bar{d}$) in youth participants, by group, topic, and behavioral objective (N = 1368)

Topic[1]	Mean score		$\bar{d}$	$s_{\bar{d}}$
	Pre	Post		
	Group I (N = 492)			
Snacks (2)	1.44	1.70	.26**	.04
Milk (4)	2.01	2.92	.91**	.07
Vitamin C (6)	2.85	4.33	1.48**	.08
Meat (8)	3.56	4.87	1.31**	.11
Breads & Cereals (11)	4.64	7.14	2.50**	.13
Vitamin A (13)	5.04	8.04	3.00**	.15
Summary—Basic 4 (6)	.71	1.09	.38**	.04
Total (34)	15.19	22.14	6.95**	.16
	Group II (N = 399)[2]			
Snacks (2)	1.52	1.58	.06	.04
Milk (4)	1.97	2.35	.38**	.08
Vitamin C (6)	2.87	3.75	.88**	.09
Meat (8)	4.00	4.26	.26*	.12
Breads & Cereals (11)	4.87	5.93	1.06**	.15
Vitamin A (13)	5.18	6.49	1.31**	.16
Summary—Basic 4 (6)	.78	.95	.17**	.05
Total (34)	15.82	18.64	2.82**	.17
	Control (N = 477)			
Snacks (2)	1.48	1.51	.03	.04
Milk (4)	1.96	1.92	−.04	.07
Vitamin C (6)	2.82	2.83	.01	.08
Meat (8)	3.91	3.79	−.12	.11
Breads & Cereals (11)	4.87	5.93	1.06**	.13
Vitamin A (13)	5.28	5.30	.02	.15
Summary—Basic 4 (6)	.78	.81	.03	.04
Total (34)	15.72	15.59	−.13	.16

[1] Numbers in parentheses indicate the number of items in the respective topic.
[2] No Group II in Vermont.
* Significant at .05 level.
** Significant at .01 level.

change in the control group was for the topic BREADS AND CEREALS. This effect could possibly be attributed to environ-

mental factors and/or an increased awareness of that food group. Thus, in the groups taught the Series, a significant change occurred in nutrition knowledge regarding the content presented in Lessons 1 through 6.

When the change in nutrition knowledge (cognitive behavior) was assessed by group and state (Table 7), the knowledge change in Minnesota, North Carolina, and Oklahoma Group I youth was appreciably greater than in the corresponding Group II youth. With the exception of a slight, positive change in Minnesota, all control groups showed a negative change.

Table 7. Nutrition knowledge change ($\bar{d}$) in youth participants, by group and state

Group	N	Mean score[1]		$\bar{d}$	$s_{\bar{d}}$
		Pre	Post		
Minnesota (N = 422)					
I	126	15.89	22.86	6.97**	.61
II	147	16.87	20.20	3.33**	.57
Control	149	16.83	16.89	.06	.56
North Carolina (N = 368)					
I	129	14.09	23.12	9.03**	.61
II	130	14.79	18.05	3.26**	.60
Control	109	16.39	15.95	−.44	.66
Oklahoma (N = 377)					
I	131	15.62	22.89	7.27**	.60
II	122	15.66	17.39	1.73**	.62
Control	124	14.74	14.62	−.12	.62
Vermont (N = 201)[2]					
I	106	15.15	19.16	4.01**	.67
II	0	—	—	—	—
Control	95	14.50	14.38	−.12	.71
Combined (N = 1368)					
I	492	15.19	22.14	6.95**	.31
II	399	15.82	18.64	2.82**	.34
Control	477	15.72	15.59	−.13	.31

[1] Possible score = 34.
[2] No Group II in Vermont.
** Significant at .01 level.

Nutrition attitude change was determined by testing the significance of the difference in mean pretest/posttest scores. The sum of responses to 21 items comprised the score. The change in nutrition attitudes (affective behavior) was significant for Group I in Minnesota, Oklahoma, and Vermont, and for Group II in North Carolina and Oklahoma (Table 8). The control group showed a slight, positive change in three states and a significant change in

Vermont. When the states were combined, all three groups of youth showed a significant change in attitude.

Table 8. Nutrition attitude change ($\bar{d}$) in youth participants, by group and state

Group	N	Mean score[1]		$\bar{d}$	$s_{\bar{d}}$
		Pre	Post		
		Minnesota (N = 422)			
I	126	13.34	15.71	2.37**	.42
II	147	15.50	15.97	.47	.38
Control	149	14.95	15.56	.61	.38
		North Carolina (N = 368)			
I	129	16.37	16.56	.19	.41
II	130	15.27	15.96	.69*	.41
Control	109	15.14	15.72	.58	.44
		Oklahoma (N = 377)			
I	131	15.06	16.47	1.41**	.41
II	122	13.93	15.36	1.43**	.42
Control	124	14.74	15.02	.28	.42
		Vermont (N = 201)[2]			
I	106	15.98	16.84	.86*	.45
II	0	—	—	—	—
Control	95	15.99	16.87	.88*	.48
		Combined (N = 1368)			
I	492	15.16	16.38	1.22**	.21
II	399	14.95	15.78	.83**	.23
Control	477	15.15	15.72	.57**	.21

[1] Possible score = 21.
[2] No Group II in Vermont.
* Significant at .05 level.
** Significant at .01 level.

When the changes in nutrition knowledge (Table 7) and attitude (Table 8) for Group I in the four states were combined, the total nutrition knowledge change was greater than the total attitude change ($\bar{d} = 6.95$ and 1.22, respectively). For Group II in Minnesota, North Carolina and Oklahoma combined, the total nutrition knowledge change was 2.82 as compared to .83 for attitude change.

The only significant change in food intake in either group occurred in Minnesota Groups I and II (Table 9). This component was measured on the basis of one entry and one exit 24-hour food intake inventory. Changes among the control groups were slight, and were negative for all states except North Carolina.

Table 9. Food intake change ($\bar{d}$) in youth participants, by group and state

Group	N	Mean score[1]		$\bar{d}$	$s_{\bar{d}}$
		Pre	Post		
		Minnesota (N = 422)			
I	126	2.86	3.35	.49*	.23
II	147	3.12	3.69	.57**	.22
Control	149	3.13	3.01	−.12	.22
		North Carolina (N = 368)			
I	129	4.13	4.13	.00	.23
II	130	3.89	4.06	.17	.23
Control	109	3.67	3.74	.07	.25
		Oklahoma (N = 377)			
I	131	3.59	3.66	.07	.23
II	122	4.15	3.69	−.46	.24
Control	124	4.55	3.28	−1.27	.24
		Vermont (N = 201)[2]			
I	106	4.39	4.20	−.19	.26
II	0	—	—	—	—
Control	95	4.77	4.64	−.13	.27
		Combined (N = 1368)			
I	492	3.72	3.82	.10	.12
II	399	3.68	3.81	.13	.13
Control	477	3.94	3.57	−.37	.12

[1] Possible score = 8.
[2] No Group II in Vermont.
* Significant at .05 level.
** Significant at .01 level.

The total nutrition behavior change, assessed by difference between youth's mean pretest/posttest scores on nutrition knowledge, attitude, and food intake, is summarized in Table 10, by group and state.

The combined entry levels (pretest scores) on nutrition behavior for Groups I and II within each state were comparable (34.07 and 34.45 mean pretest score, respectively). Group I youth in Minnesota, North Carolina, and Oklahoma showed an appreciably greater total nutrition behavior change than their counterparts in Group II (Table 10). The change in control youth groups was negligible and in Oklahoma was negative, which indicated that the pretest may not have sensitized the youth to nutrition references in their environment.

Table 10. Nutrition behavior change ($\bar{d}$) in youth participants, by group State

Group	N	Mean score[1]		$\bar{d}$	$s_{\bar{d}}$
		Pre	Post		
		Minnesota (N = 422)			
I	126	32.09	41.91	9.82**	.67
II	147	35.50	39.86	4.36**	.62
Control	149	34.91	35.46	.55	.61
		North Carolina (N = 368)			
I	129	34.60	43.81	9.21**	.66
II	130	33.94	38.07	4.13**	.66
Control	109	35.19	35.42	.23	.72
		Oklahoma (N = 377)			
I	131	34.27	43.02	8.75**	.65
II	122	33.74	36.44	2.70**	.68
Control	124	34.02	32.92	−1.10	.67
		Vermont (N = 201)[2]			
I	106	35.52	40.20	4.68**	.73
II	0	—	—	—	—
Control	95	35.25	35.89	.64	.77
		Combined (N = 1368)			
I	492	34.07	42.34	8.27**	.34
II	399	34.45	38.23	3.78**	.38
Control	477	34.81	34.88	.07	.34

[1] Possible score = 63.
[2] No Group II in Vermont.
** Significant at .01 level.

4. *Sociocultural Characteristics of Youth and Nutrition Behavior Change*

An objective of the research project was to determine if the nutrition behavior change that occurred in the youth taught the Lesson Series (Groups I and II) was related to youth characteristics of age, sex, grade in school, place of residence (rural/urban), and participation in school food programs.

A separate multiple regression for each youth characteristic was used to perform an analysis of variance to establish the F-values for significance of each characteristic and its possible interaction with state and group. The results of the analysis of variance of nutrition behavior change for youth characteristics appear in Table 11. These data indicate no relationship between nutrition behavior change that occurred in the youth and youth characteristics. However, significant interactions by state and by group were indicated. Thus, further analyses were made to deter-

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mine differences that might be attributable to interactions of those two factors (i.e., group and state) with nutrition behavior change. The results are discussed in the sections that follow.

Table 11. Summary of learner characteristics and their relationship to nutrition behavior change (N = 891 youth)

Learner characteristic	df[1]	F-values for variables (ANOVA)			
		State	Group[2]	State* Group[2]	i
Age	4	2.73*	106.37**	.26	.24
Grade in school	6	2.73*	106.33**	.26	.82
Sex	1	2.71*	105.61**	.26	1.78
Place of residence	1	2.83*	110.32**	.27	.21
School Breakfast Program	4	2.69*	104.65**	.26	1.16
School Lunch Program	4	2.69*	104.66**	.26	.66

[1] For independent variable.
[2] No Group II in Vermont.
* Significant at .05 level.
** Significant at .01 level.

Age

Table 12 shows that a significant nutrition behavior change occurred in all combined age groups (8 through 12) of youth taught the Lesson Series. The smallest difference ($\bar{d} = 2.07$) between mean pretest/posttest scores was noted in Group II 8-year-olds; the largest difference ($\bar{d} = 10.00$) was in their Group I counterparts. Group I youth attained consistently greater change than Group II youth at each age level.

Minnesota, North Carolina, and Oklahoma Group I participants attained greater nutrition behavior change than their counterparts in Vermont. Minnesota and North Carolina Group II youth registered greater change scores than Oklahoma Group II participants.

Grade in School

Significant mean difference scores were noted for Groups I and II youth in grades 2 through 6 (Table 13), with the exception of Group II second-grade youth. Although Group I mean difference scores steadily decreased from grade 2 ($\bar{d} = 9.91$) through grade 7 ($\bar{d} = 6.10$), the change scores at each grade level were greater than for Group II. Total mean difference score for Group I youth in all four states was 8.27 as contrasted to 3.78 for Group II in Minnesota, North Carolina, and Oklahoma.

The combined nutrition behavior change scores for Minnesota, North Carolina, and Oklahoma youth were greater than the combined change scores for Vermont youth. Minnesota Group I and II

Table 12. Nutrition behavior change ($\bar{d}$) in youth taught the Lesson Series, by group, state, and age

Age yr	Group I (N = 492)			Group II (N = 399)[1]			Combined (N = 891)		
	N	$\bar{d}$	$s_{\bar{d}}$	N	$\bar{d}$	$s_{\bar{d}}$	N	$\bar{d}$	$s_{\bar{d}}$
Minnesota									
8	12	13.08**	2.15	20	3.75*	1.67	32	7.25**	1.32
9	32	8.41**	1.32	29	4.72**	1.39	61	6.66**	.96
10	37	10.08**	1.23	55	4.18**	1.01	92	6.55**	.78
11	29	7.41**	1.39	40	4.58**	1.18	69	5.77**	.90
12	16	14.00**	1.87	3	5.67	4.31	19	12.68**	1.71
Total	126	9.82**	.66	147	4.37**	.62	273	6.89**	.45
North Carolina									
8	25	12.37**	1.49	41	1.24	1.17	66	5.45**	.92
9	22	9.36**	1.59	35	6.11**	1.26	57	7.37**	.99
10	31	10.48**	1.34	26	4.42**	1.46	57	7.72**	.99
11	26	7.12**	1.46	18	6.00**	1.76	44	6.66**	1.12
12	25	6.56**	1.49	10	4.90	2.36	35	6.09**	1.26
Total	129	9.22**	.66	130	4.13**	.65	259	6.66**	.46
Oklahoma									
8	22	9.23**	1.59	0	—	—	22	9.23**	1.59
9	28	7.21**	1.41	5	4.40	3.34	33	6.79**	1.30
10	26	8.88**	1.46	78	2.53**	.84	104	4.12**	.73
11	34	8.21**	1.28	37	3.16*	1.23	71	5.58**	.89
12	21	11.00**	1.63	2	—3.00	5.28	23	9.78**	1.56
Total	131	8.74**	.65	122	2.70**	.68	253	5.83**	.47
Vermont									
8	17	5.35**	1.81	0	—	—	17	5.35**	1.81
9	22	6.86**	1.59	0	—	—	22	6.86**	1.59
10	15	4.07	1.93	0	—	—	15	4.07	1.93
11	26	4.69**	1.46	0	—	—	26	4.69**	1.46
12	26	2.73	1.46	0	—	—	26	2.73	1.46
Total	106	4.68**	.72	0	—	—	106	4.68**	.72
Combined									
8	76	10.00**	.86	61	2.07*	.96	137	6.47**	.64
9	104	7.96**	.73	69	5.41**	.90	173	6.94**	.57
10	109	9.08**	.72	159	3.41**	.59	268	5.72**	.46
11	115	6.97**	.70	95	4.29**	.77	210	5.76**	.52
12	88	6.84**	.80	15	4.00*	1.94	103	6.43**	.74
Total	492	8.09**	.34	399	3.78**	.38	891	6.16**	.25

[1] No Group II in Vermont.
* Significant at .05 level.
** Significant at .01 level.

youth registered greater change scores than their counterparts in corresponding groups in the other states.

Sex

The female learner demonstrated a greater nutrition behavior change (Table 14) than the male learner ($\bar{d} = 6.91$ and 5.19, respectively). The mean difference scores for the males and females were greater in Group I than Group II.

Female participants in Minnesota, North Carolina, and Oklahoma attained greater change scores than female learners in Vermont. Minnesota and North Carolina male participants made greater nutrition behavior change than their Oklahoma and Vermont counterparts.

Place of Residence (Rural/Urban)

Place of residence in this study was defined as rural or urban. The lessons were developed primarily to be used with EFNEP youth in urban or depressed areas. The relationship between

Table 13. Nutrition behavior change ($\bar{d}$) in youth taught the Lesson Series, by group, state, and grade in school

Grade in school	Group I (N = 492)			Group II (N = 399)[1]			Combined (N = 891)		
	N	$\bar{d}$	$^{s}\bar{d}$	N	$\bar{d}$	$^{s}\bar{d}$	N	$\bar{d}$	$^{s}\bar{d}$
Minnesota									
1	0	—	—	0	—	—	0	—	—
2	4	11.75*	3.73	0	—	—	4	11.75*	3.73
3	9	11.22**	2.49	24	5.17**	1.52	33	6.82**	1.30
4	41	7.41**	1.17	31	3.68**	1.34	72	5.81**	.88
5	32	10.09**	1.32	64	3.59**	.93	96	5.76**	.76
6	34	12.38**	1.28	28	6.21**	1.41	62	9.60**	.95
7	6	7.10	3.05	0	—	—	6	7.00	3.05
Total	126	9.82**	.66	147	4.37**	.62	273	6.89**	.45
North Carolina									
1	0	—	—	1	0.00	7.50	1	0.00	7.50
2	14	13.36**	1.99	23	.96	1.56	37	5.65**	1.23
3	20	10.40**	1.67	31	1.71	1.34	51	5.12**	1.04
4	33	10.42**	1.30	43	6.49**	1.14	76	8.20**	.86
5	27	7.48**	1.44	15	3.67	1.93	42	6.12**	1.15
6	26	7.31**	1.46	17	7.52**	1.81	43	7.40**	1.14
7	9	6.44*	2.49	0	—	—	9	6.44*	2.49
Total	129	9.22**	.66	130	4.13**	.65	259	6.66**	.46
Oklahoma									
1	0	—	—	0	—	—	0	—	—
2	6	10.17*	3.05	0	—	—	6	10.17*	3.05
3	26	8.42**	1.46	0	—	—		8.42**	1.46
4	30	8.67**	1.36	0	—	—	30	8.67**	1.36
5	27	9.44**	1.44	122	2.70**	.68	149	3.93**	.61
6	39	8.87**	1.19	0	—	—	39	8.87**	1.19
7	3	1.67	4.31	0	—	—	3	1.67	4.31
Total	131	8.74**	.65	122	2.70**	.68	253	5.83**	.47

(Continued on page 52)

(Table 13 (Continued)

Grade in school	Group I (N = 492)			Group II (N = 399)[1]			Combined (N = 891)		
	N	$\bar{d}$	$s_{\bar{d}}$	N	$\bar{d}$	$s_{\bar{d}}$	N	$\bar{d}$	$s_{\bar{d}}$
					Vermont				
1	0	—	—	0	—	—	0	—	—
2	8	2.75	2.64	0	—	—	8	2.75	2.64
3	23	6.78**	1.56	0	—	—	23	6.78**	1.56
4	14	4.86*	1.99	0	—	—	14	4.86*	1.99
5	18	4.83**	1.76	0	—	—	18	4.83**	1.76
6	41	3.56**	1.17	0	—	—	41	3.56**	1.17
7	2	8.50	5.28	0	—	—	2	8.50	5.28
Total	106	4.68**	.72	0	—	—	106	4.68**	.72
					Combined				
1	0	—	—	1	0.00	7.50	1	0.00	7.50
2	32	9.91**	1.32	23	.96	1.56	55	6.17**	1.01
3	78	8.77**	.85	55	3.22**	1.01	133	6.47**	.65
4	118	8.27**	.69	74	5.31**	.87	192	7.13**	.54
5	104	8.34**	.73	201	3.06**	.53	305	4.86**	.43
6	140	7.88**	.63	45	6.71**	1.12	185	7.60**	.55
7	20	6.10**	1.68	0	—	—	20	6.10**	1.68
Total	492	8.27**	.34	399	3.78**	.38	891	6.26**	.25

[1] All Oklahoma Group II youth were in the fifth grade; no Group II in Vermont.
* Significant at .05 level.
** Significant at .01 level.

nutrition behavior change and place of residence was determined by group and state. These comparisons were based on incomplete data, since Minnesota had no rural youth and Vermont had no Group II.

The data in Table 15 show that Group I rural youth attained a higher mean difference score than their urban counterparts ($\bar{d} = 9.01$ and 7.73, respectively). Conversely, Group II urban youth had a higher mean difference score than Group II rural youth ($\bar{d} = 4.28$ and 2.36, respectively). The combined mean difference score for all rural youth was 6.81 as contrasted to 5.97 for urban youth.

North Carolina and Vermont urban youth (Table 15) attained higher mean difference scores than their rural counterparts ($\bar{d} = 7.86$ and 5.46 as contrasted to 5.90 and 2.70, respectively). Oklahoma rural youth attained a higher mean difference score than urban youth in that state ($\bar{d} = 8.98$ and 2.85, respectively). Oklahoma rural youth attained a higher mean difference score than any other residential group in the four states.

Table 14. Nutrition behavior change ($\bar{d}$) in youth taught the Lesson Series, by group, state, and sex

Sex	Group I (N = 492)			Group II (N = 399)[1]			Combined (N = 891)		
	N	$\bar{d}$	$s_{\bar{d}}$	N	$\bar{d}$	$s_{\bar{d}}$		$\bar{d}$	$s_{\bar{d}}$
Minnesota									
Male	23	13.74**	1.56	71	4.41**	.89	94	6.69**	.77
Female	103	8.95**	.74	76	4.33**	.86	179	6.99**	.56
Total	126	9.82**	.66	147	4.37**	.62	273	6.89**	.45
North Carolina									
Male	52	8.40**	1.03	59	2.41*	.97	111	5.21**	.71
Female	77	9.77**	.85	71	5.56**	.89	148	7.75**	.61
Total	129	9.22**	.66	130	4.13**	.65	259	6.66**	.46
Oklahoma									
Male	35	8.29**	1.26	64	2.05*	.93	99	4.25**	.75
Female	96	8.92**	.76	58	3.43**	.98	154	6.85**	.60
Total	131	8.74**	.65	122	2.70**	.68	253	5.83**	.47
Vermont									
Male	34	3.74**	1.28	0	—	—	34	3.74**	1.28
Female	72	5.12**	.88	0	—	—	72	5.12**	.88
Total	106	4.68**	.72	0	—	—	106	4.68**	.72
Combined									
Male	144	8.12**	.63	194	3.02**	.54	338	5.19**	.41
Female	348	8.33**	.40	205	4.50**	.53	553	6.91**	.32
Total	492	8.27**	.34	399	3.78**	.38	891	6.26**	.25

[1] No Group II in Vermont.
* Significant at .05 level.
** Significant at .01 level.

School Food Programs

The two school food programs considered in this study were the Breakfast and Lunch Programs. Participation in the Breakfast Program was more limited than in the Lunch Program, due principally to the lack of availability of the former. In general, equivalent or greater nutrition behavior change was noted between Group I youth who were participants and nonparticipants in the food programs (Table 16). Exceptions were the Vermont Breakfast Program participants and Lunch Program nonparticipants. Group II youth experienced more variation in levels of significance of nutrition behavior change. Minnesota and Oklahoma Group II School Breakfast participants and Oklahoma School Lunch nonparticipants showed no significant change in nutrition behavior.

Table 15. Nutrition behavior change ($\bar{d}$) in youth taught the Lesson Series, by group, state, and place of residence (rural/urban)

Place of residence	Group I (N = 492)			Group II (N = 399)[1]			Combined (N = 891)		
	N	$\bar{d}$	$s_{\bar{d}}$	N	$\bar{d}$	$s_{\bar{d}}$	N	$\bar{d}$	$s_{\bar{d}}$
Minnesota									
Rural[2]	0	—	—	0	—	—	0	—	—
Urban	126	9.83**	.66	147	4.37**	.61	273	6.89**	.45
Total	126	9.83**	.66	147	4.37**	.61	273	6.89**	.45
North Carolina									
Rural	55	12.53**	.99	103	2.36**	.72	158	5.90**	.59
Urban	74	6.76**	.86	27	10.89**	1.42	101	7.86**	.73
Total	129	9.22**	.65	130	4.13**	.65	259	6.66**	.46
Oklahoma									
Rural .	123	8.98**	.66	0	—	—	123	8.98**	.66
Urban	8	5.12	2.60	122	2.70**	.67	130	2.85**	.64
Total	131	8.74**	.64	122	2.70**	.67	253	5.83**	.46
Vermont									
Rural	30	2.70	1.34	0	—	—	30	2.70	1.34
Urban	76	5.46**	.84	0	—	—	76	5.46**	.84
Total	106	4.68**	.71	0	—	—	106	4.68**	.71
Combined									
Rural	208	9.01**	.51	103	2.36**	.72	311	6.81**	.42
Urban	284	7.73**	.44	296	4.28**	.43	580	5.97**	.31
Total	492	8.27**	.33	399	3.78**	.37	891	6.26**	.25

[1] No rural Group II youth in Oklahoma; no Group II in Vermont.
[2] No rural youth in Minnesota.
** Significant at .01 level.

5. *Sociocultural Characteristics of Youth's Family and Nutrition Behavior Change*

The 891 youth who were taught the Lesson Series represented 735 families. Personal data concerning those families were limited in Minnesota, as explained earlier, and in some cases families failed to respond to certain categories (see Table 5). These two factors contributed to the discrepancies in total number of youth in all tables pertaining to family characteristics.

As for youth characteristics (Table 11), a separate multiple regression was made for each family characteristic and its possible interaction with state and group. The family characteristics that were thought to be related to nutrition behavior change in youth were: income, number of children in family, age of homemaker, level of formal education of head-of-household, occupation of head-

Table 16. Nutrition behavior change ($\bar{d}$) in youth taught the Lesson Series, by group, state, and participation in school food programs[1]

School food program	Group I (N = 492)			Group II (N = 399)[2]			Combined (N = 891)[3]		
	N	$\bar{d}$	$s_{\bar{d}}$	N	$\bar{d}$	$s_{\bar{d}}$	N	$\bar{d}$	$s_{\bar{d}}$
Minnesota									
Breakfast:									
Yes	13	8.31**	2.08	15	2.20	1.94	28	5.04**	2.01
No	113	10.00**	.71	132	4.61**	.65	245	7.10**	.68
Lunch:									
Yes	95	10.22**	.77	47	3.26*	1.09	142	7.92**	.89
No	31	8.61**	1.35	100	4.89**	.75	131	5.77**	.93
North Carolina									
Breakfast:									
Yes	58	8.12**	.97	60	4.47**	.97	118	6.26**	.98
No	71	10.11**	.89	70	3.84**	.90	141	7.00**	.89
Lunch:									
Yes	117	9.40**	.69	118	3.92**	.69	235	6.65**	.69
No	12	7.42**	2.17	12	6.17*	2.17	24	6.80**	2.17
Oklahoma									
Breakfast:									
Yes	12	9.50**	2.17	40	2.18	1.19	52	3.87**	1.47
No	119	8.67**	.69	82	2.96**	.83	201	6.34**	.75
Lunch:									
Yes	124	8.83**	.67	92	2.71**	.78	216	6.22**	.72
No	7	7.29*	2.83	30	2.67	1.37	37	3.54**	1.75
Vermont									
Breakfast:									
Yes	4	3.75	3.75	0	—	—	4	3.75	3.75
No	102	4.72**	.74	0	—	—	102	4.72**	.74
Lunch:									
Yes	94	4.69**	.77	0	—	—	94	4.69**	.77
No	12	4.58	2.17	0	—	—	12	4.58**	2.17
Combined									
Breakfast:									
Yes	87	8.14**	.80	115	3.38**	.70	202	5.43**	.75
No	405	8.29**	.37	284	3.94**	.45	689	6.50**	.40
Lunch:									
Yes	430	8.39**	.36	257	3.37**	.47	687	6.51**	.41
No	62	7.45**	.95	142	4.53**	.63	204	5.42**	.74

[1] Discrepancy in totals due to some youth participating in both programs and some participating in only one or none.
[2] No Group II in Vermont.
* Significant at .05 level.
** Significant at .01 level.

of-household, and homemaker's participation in EFNEP. The results of the analysis appear in Table 17.

Table 17. Summary of the relationships of family characteristics to nutrition behavior change

Family characteristics	N[1]	df[2]	F-values for variables (ANOVA)			
				Group[3]	State* Group[3]	i
Family income[4]	603	5	3.37*	74.93**	.27	2.66*
Number of children in family[5]	826	9	2.11	88.61**	.90	1.08
Age of homemaker[4]	602	4	3.04*	70.20**	.79	2.75*
Educational level of head-of-household[4]	589	4	2.81	66.68**	.31	.58
Occupation of head-of-household[4]	584	3	2.69	67.77**	.70	2.42
Homemaker's participation in the EFNEP[4]	571	2	1.51	63.57**	.56	1.76

[1] Variation in number of youth participants due to "no response."
[2] For i variable.
[3] No Group II in Vermont.
[4] For North Carolina, Oklahoma, and Vermont only.
[5] Includes all four states.
* Significant at .05 level.
** Significant at .01 level.

The data in Table 17 indicate a relationship between the nutrition behavior change that occurred in the youth and only two family characteristics—income and age of homemakers. However, significant interactions were noted by state for family income and age of homemaker, and for all six characteristics by group.

Family Income

Nutrition behavior change was significantly (.05 level) related to family income in North Carolina, Oklahoma, and Vermont (Table 17). When the youth in those families reporting from the three states (Table 18) were compared by group and state, the nutrition behavior change in North Carolina and Oklahoma Group I youth was related to family income of over $83/month. In Vermont Group I, the family income had to be over $333/month to be associated with the change that occurred. For North Carolina and Oklahoma Group II youth, respectively, family incomes of over $167 and over $417 were related to the nutrition behavior change that occurred. Although the Series was developed for EFNEP disadvantaged youth, few of the youth's families in the three states reporting had incomes below $168/month. Nutrition behavior change in those youth was less than for youth whose families had higher income levels.

Table 18. Nutrition behavior change ($\bar{d}$) in youth taught the Lesson Series in North Carolina, Oklahoma, and Vermont, by group, state, and family income[1]

Income per month	Group I (N = 352)			Group II (N = 251)[2]			Combined (N = 603)[3]		
	N	$\bar{d}$	$s_{\bar{d}}$	N	$\bar{d}$	$s_{\bar{d}}$	N	$\bar{d}$	$s_{\bar{d}}$
North Carolina									
$83 or less	3	.33	4.35	13	.69	2.08	16	.62	1.88
$84-167	11	6.82**	2.27	16	.88	1.88	27	3.30**	1.45
$168-250	37	7.49**	1.24	30	5.33**	1.37	67	6.52**	.92
$251-333	18	10.28**	1.78	17	6.12**	1.83	35	8.26**	1.27
$334-417	39	11.79**	1.21	29	3.59**	1.40	68	8.29**	.84
$418 or more	11	12.00**	2.27	24	6.13**	1.54	35	7.97**	1.27
Total	119	9.50**	.52	129	4.17**	.64	248	6.73**	.46
Oklahoma									
$83 or less	0	—	—	2	3.50	5.34	2	3.50	5.34
$84-167	2	11.00*	5.34	2	−4.00	5.34	4	3.50	3.76
$168-250	13	14.08**	2.08	7	4.29	2.84	20	10.65**	1.68
$251-333	30	7.20**	1.37	8	.63	2.66	38	6.02**	1.22
$334-417	28	8.75**	1.42	19	1.95	1.73	47	6.00**	1.10
$418 or more	56	8.18**	1.01	84	2.99**	.82	140	5.07**	.64
Total	129	8.71**	.64	122	2.70	.66	251	5.79**	.46
Vermont									
$83 or less	0	—	—	0	—	—	0	—	—
$84-167	1	6.00	7.50	0	—	—	1	6.00	7.50
$168-250	3	4.00	4.35	0	—	—	3	4.00	4.35
$251-333	16	2.81	2.67	0	—	—	16	2.81	2.67
$334-417	40	5.95**	1.19	0	—	—	40	5.95**	1.19
$418 or more	44	3.91**	1.13	0	—	—	44	3.91**	1.13
Total	104	4.55**	.72	0	—	—	104	4.55**	.72

[1] Data unavailable from Minnesota.
[2] North Carolina and Oklahoma only.
[3] Discrepancy in totals due to "no response."
* Significant at .05 level.
** Significant at .01 level.

Number of Children in Family

Significant differences were noted in all of the combined number of children in family categories (Table 19). The greatest mean difference scores were noted among Group I youth from 8, 5, and 3-children families, respectively. Group II youth in 1, 2, 5, and 10-children families showed the greatest change. No significant change occurred among Group II youth from 8 and 9-children families. Group I learners attained higher change scores than Group II learners. This held true for all the number of children

categories except in the 10-children family in Minnesota, the 1-child family in Oklahoma, and the 9-children family in Vermont.

Age of Homemaker

Analysis of variance (Table 17) revealed a significant relationship between nutrition behavior change and age of homemaker. Comparisons of these variables by group and state were possible only for those reporting in North Carolina, Oklahoma, and Vermont (Table 20). A significant nutrition behavior change was associated with the combined homemaker age categories for both groups and all states, except for those homemakers who were 18 years of age or less. Homemakers in the 26-35 and 36-45 age categories far outnumbered those in other age categories. Youth in those two homemaker age categories, combined by groups and states, attained greater change than those whose homemakers were in the other age groups. The nutrition behavior change was consistently less for Group II than Group I youth for each homemaker age category.

Educational Level of Head-of-Household

The data in Table 21 show that youth in all the combined head-of-household educational categories in Group I attained greater nutrition behavior change than those in Group II. The least amount of change occurred in Group II and in the head-of-house-

Table 19. Nutrition behavior change ($\bar{d}$) in youth taught the Lesson Series, by group, state, and number of children in family

Number of children	Group I (N = 437)			Group II (N = 389)[1]			Combined (N = 826)[2]		
	N	$\bar{d}$	$s_{\bar{d}}$	N	$\bar{d}$	$s_{\bar{d}}$	N	$\bar{d}$	$s_{\bar{d}}$
				Minnesota					
1	1	15.00	7.36	7	9.29*	2.78	8	10.00**	2.60
2	9	9.44**	2.45	27	3.59*	1.42	36	5.00**	1.23
3	22	8.81**	1.57	31	4.32**	1.32	53	6.19**	1.01
4	14	9.50**	1.97	23	5.35**	1.53	37	6.92**	1.21
5	10	6.30*	2.33	19	2.84	1.69	29	4.03**	1.37
6	3	7.00	4.25	13	4.15	2.04	16	4.69**	1.84
7	9	11.33**	2.45	8	3.38	2.60	17	7.59**	1.78
8	7	16.29**	2.78	5	3.40	3.29	12	10.92**	2.12
9	0	—	—	5	3.80	3.29	5	3.80*	3.29
10	9	−1.67	2.45	1	6.00	7.36	10	−0.90	2.33
Total	84	8.48**	.80	139	4.29**	.62	223	5.87**	.49
				North Carolina					
1	1	5.00	7.36	11	3.55	2.22	12	3.67*	2.12
2	11	6.09*	2.22	26	4.88**	1.44	37	5.24**	1.20
3	24	7.96**	1.50	21	4.10*	1.60	45	6.16**	1.10
4	12	12.00**	2.12	24	2.96	1.50	36	5.97**	1.23

Table 19 (Continued)

Number of children	Group I (N = 437)			Group II (N = 389)[1]			Combined (N = 826)[2]		
	N	$\bar{d}$	$s_{\bar{d}}$	N	$\bar{d}$	$s_{\bar{d}}$	N	$\bar{d}$	$s_{\bar{d}}$
5	13	10.54**	2.04	17	5.47**	1.78	30	7.67**	1.34
6	21	9.00**	1.60	8	2.12	2.60	29	7.10**	1.37
7	15	6.73**	1.90	10	5.80*	2.33	25	6.36**	1.47
8	17	11.65**	1.78	4	1.75	3.68	21	9.76**	1.60
9	1	9.00	7.36	0	—	—	1	9.00	7.36
10	8	13.88**	2.60	7	5.43	2.78	15	9.93**	1.90
Total	123	9.37**	.66	128	4.19**	.65	251	6.73**	.46
Oklahoma									
1	2	0.50	5.20	7	2.86	2.78	9	2.33	2.45
2	12	6.17*	2.12	26	4.23*	1.44	38	4.84**	1.19
3	28	10.79**	1.39	30	1.37	1.34	58	5.91**	.97
4	17	7.47**	1.78	21	1.95	1.60	38	4.42**	1.19
5	24	13.46**	1.50	22	4.50**	1.57	46	9.17**	1.08
6	11	10.91**	2.22	8	2.12	2.60	19	7.21**	1.69
7	9	3.11	2.45	2	−3.50	5.20	11	1.91	2.22
8	6	4.17	3.00	0	—	—	6	4.17	3.00
9	11	5.82*	2.22	3	−2.67	4.25	14	4.00**	1.97
10	8	6.88*	2.60	3	5.67	4.25	11	6.55*	2.22
Total	128	8.74**	.65	122	2.70**	.67	250	5.80**	.47
Vermont									
1	3	6.67	4.25	0	—	—	3	6.67	4.25
2	7	3.57	2.78	0	—	—	7	3.57	2.78
3	13	5.54*	2.04	0	—	—	13	5.54*	2.04
4	19	4.47*	1.69	0	—	—	19	4.47*	1.69
5	21	4.38*	1.60	0	—	—	21	4.38*	1.60
6	12	3.17	2.12	0	—	—	12	3.17	2.12
7	18	5.06**	1.73	0	—	—	18	5.06**	1.73
8	1	6.00	7.36	0	—	—	1	6.00	7.36
9	3	−1.00	4.25	0	—	—	3	−1.00	4.25
10	5	8.80*	3.29	0	—	—	5	8.80*	3.29
Total	102	4.61**	.73	0	—	—	102	4.61**	.73
Combined									
1	7	5.86*	2.78	25	4.96**	1.47	32	5.16**	1.30
2	39	6.44**	1.18	79	4.23**	.83	118	4.96**	.69
3	87	8.72**	.79	82	3.18**	.81	169	6.03**	.56
4	62	7.89**	.93	68	3.46**	.89	130	5.57**	.64
5	68	9.04**	.89	58	4.24**	.96	126	6.83**	.65
6	47	7.83**	1.07	29	3.03*	1.36	76	6.00**	.84
7	51	6.31**	1.03	20	3.90**	1.64	71	5.63**	.87
8	31	11.06**	1.32	9	2.67	2.45	40	9.17**	1.16
9	15	4.67**	1.90	8	1.38	2.60	23	3.53*	1.53
10	30	6.50**	1.34	11	5.55**	2.21	41	6.25**	1.15
Total	437	7.90**	.35	389	3.76**	.37	826	5.95**	.26

[1] No Group II in Vermont.
[2] Discrepancy in totals due to "no response."
* Significant at .05 level.
** Significant at .01 level.

Table 20. **Nutrition behavior change ($\bar{d}$) in youth taught the Lesson Series in North Carolina, Oklahoma, and Vermont, by group, state, and age of homemaker**[1]

Age of homemaker	Group I (N = 355)			Group II (N = 247)[2]			Combined (N = 602)[3]		
	N	$\bar{d}$	$s_{\bar{d}}$	N	$\bar{d}$	$s_{\bar{d}}$	N	$\bar{d}$	$s_{\bar{d}}$
North Carolina									
18 or less	0	—	—	0	—	—	0	—	—
19-25	2	9.00	5.24	5	−1.00	3.30	7	1.86	2.79
26-35	37	10.57**	1.08	69	5.12**	.89	116	7.33**	.68
36-45	48	8.69**	1.06	27	3.67*	1.42	75	6.88**	.85
46 or more	25	7.84**	1.47	25	3.68*	1.47	50	5.76**	1.04
Total	122	9.25**	.67	126	4.28**	.66	248	6.72**	.47
Oklahoma									
18 or less	1	−1.00	7.37	0	—	—	1	−1.00	7.37
19-25	2	14.50	5.24	5	7.00	3.30	7	9.14*	2.79
26-35	55	8.87**	.99	68	4.01**	.89	123	6.19**	.66
36-45	52	9.62**	1.02	37	−0.30	1.21	89	5.49**	.78
46 or more	18	5.72**	1.74	11	1.55	2.22	29	4.14**	1.37
Total	128	8.74**	.65	121	2.60**	.67	249	5.76**	.47
Vermont									
18 or less	1	1.00	7.37	0	—	—	1	1.00	7.37
19-25	2	2.00	5.24	0	—	—	2	2.00	5.24
26-35	55	5.09**	.99	0	—	—	55	5.09**	.99
36-45	38	5.16**	1.20	0	—	—	38	5.16**	1.20
46 or more	9	0.89	2.46	0	—	—	9	0.89	2.46
Total	105	4.66**	.72	0	—	—	105	4.66**	.72
Combined									
18 or less	2	0.00	5.24	0	—	—	2	0.00	5.24
19-25	6	8.50**	3.01	10	3.00	2.34	16	5.06**	1.85
26-35	157	8.06**	.59	137	4.57**	.63	294	6.43**	.43
36-45	138	8.07**	.63	64	1.38	.92	202	5.95**	.52
46 or more	52	5.90**	1.02	36	3.03**	1.23	88	4.73**	.79
Total	355	7.71**	.39	247	3.45**	.47	602	5.96**	.30

[1] No data available from Minnesota.
[2] No Group II in Vermont.
[3] Discrepancy in totals due to "no response."
* Significant at .05 level.
** Significant at .01 level.

hold category, college graduate or more. Although differences may be noted between the two groups with respect to nutrition behavior change recorded for respondents encompassed therein, it seems safe to conclude that youngsters in both groups whose heads-of-household had a high school education or less experienced the greatest nutrition behavior change.

Table 21. **Nutrition behavior change ($\bar{d}$) in youth taught the Lesson Series in North Carolina, Oklahoma, and Vermont, by group, state, and educational level of head-of-household[1]**

Educational level[4]	Group I (N = 350)			Group II (N = 239)[2]			Combined (N = 589)[3]		
	N	$\bar{d}$	$s_{\bar{d}}$	N	$\bar{d}$	$s_{\bar{d}}$	N	$\bar{d}$	$s_{\bar{d}}$
North Carolina									
1	37	10.73**	1.23	65	3.35**	.93	102	6.03**	.74
2	41	8.76**	1.17	25	6.60**	1.50	66	7.94**	.92
3	39	9.21**	1.20	27	4.19**	1.44	66	7.15**	.92
4	2	−1.00	5.29	5	4.00	3.35	7	2.57	2.83
5	0	—	—	0	—	—	0	—	—
Total	119	9.35**	.69	122	4.22**	.68	241	6.76**	.48
Oklahoma									
1	30	7.57**	1.37	9	1.00	2.49	39	6.05**	1.20
2	34	8.71**	1.28	13	2.15	2.08	47	6.89**	1.09
3	53	9.00**	1.03	60	3.80**	.97	113	6.24**	.70
4	9	11.22**	2.49	15	3.20	1.93	24	6.21**	1.53
5	2	9.00	5.29	20	1.10	1.67	22	1.82	1.60
Total	128	8.74**	.66	117	2.86**	.69	245	5.93**	.48
Vermont									
1	37	4.86**	1.23	0	—	—	37	4.86**	1.23
2	21	2.38	1.63	0	—	—	21	2.38	1.63
3	33	5.27**	1.30	0	—	—	33	5.27**	1.30
4	12	6.75**	2.16	0	—	—	12	6.75**	2.16
5	0	—	—	0	—	—	0	—	—
Total	103	4.71**	.74	0	—	—	103	4.71**	.74
Combined									
1	104	7.73**	.73	74	3.07**	.86	178	5.79**	.56
2	96	7.34**	.76	38	5.08**	1.21	134	6.70**	.64
3	125	8.08**	.66	87	3.92**	.80	212	6.37**	.51
4	23	7.83**	1.55	20	3.40*	1.66	43	5.77**	1.13
5	2	9.00*	5.27	20	1.10	1.66	22	1.82	1.58
Total	350	7.76**	.40	239	3.56**	.45	589	6.06**	.31

[1] No data available for Minnesota.
[2] No Group II in Vermont.
[3] Discrepancy in totals due to "no response."
[4] 1 = 8th grade or less; 2 = 1-3 yr. high school; 3 = high school graduate; 4 = 1-3 yr college; 5 = college graduate or more.
* Significant at .05 level.
** Significant at .01 level.

Occupation of Head-of-Household

The interaction of group with effect of occupation of head-of-household on nutrition behavior change is treated in Table 22. Although analysis of variance revealed no relationship between occupation of head-of-household and nutrition behavior change (Table 17), a group effect was noted for the three states concerning

this variable. Of those reporting in North Carolina, Oklahoma, and Vermont, Group I youth in families where the head-of-household represented any of the occupational categories experienced a significant nutrition behavior change (Table 22), except for

Table 22. Nutrition behavior change ($\bar{d}$) in youth taught the Lesson Series in North Carolina, Oklahoma, and Vermont, by group, state, and occupation of head-of-household[1]

Occupation category[4]	Group I (N = 347)			Group II (N = 237)[2]			Combined (N = 584)[3]		
	N	$\bar{d}$	$s_{\bar{d}}$	N	$\bar{d}$	$s_{\bar{d}}$	N	$\bar{d}$	$s_{\bar{d}}$
North Carolina									
1	0	—	—	2	8.00	5.26	2	8.00	5.26
2	44	8.29**	1.12	53	4.41**	1.02	97	6.17**	.75
3	37	13.40**	1.22	40	1.80	1.17	77	7.37**	.85
4	34	5.91**	1.27	24	7.63**	1.51	58	6.62**	.97
Total	115	9.23**	.69	119	4.24**	.68	234	6.70**	.48
Oklahoma									
1	4	13.00**	3.71	22	4.90**	1.58	26	6.15**	1.45
2	52	8.75**	1.03	62	1.81*	.96	114	4.98**	.69
3	32	6.00**	1.31	22	1.36	1.58	54	4.10**	1.01
4	41	10.37**	1.16	12	4.67*	2.14	53	9.08**	1.02
Total	129	8.71**	.65	118	2.59**	.68	247	5.79**	.47
Vermont									
1	8	6.88**	2.62	0	—	—	8	6.88**	2.62
2	41	5.44**	1.16	0	—	—	41	5.44**	1.16
3	12	0.00	2.14	0	—	—	12	0.00	2.14
4	42	4.93**	1.14	0	—	—	42	4.93**	1.14
Total	103	4.71**	.73	0	—	—	103	4.71**	.73
Combined									
1	12	8.92**	2.14	24	5.16**	1.51	36	6.42**	1.23
2	137	7.61**	0.63	115	3.01**	0.69	252	5.51**	0.47
3	81	8.49**	0.82	62	1.64**	0.94	143	5.52**	0.62
4	117	7.12**	0.68	36	6.64**	1.23	153	7.01**	0.60
Total	117	7.70	0.40	237	3.42	0.48	584	5.96	0.31

[1] Data unavailable from Minnesota.
[2] North Carolina and Oklahoma only.
[3] Discrepancy in totals due to "no response."
[4] 1 = professional, technical and managerial workers; officials and proprietors, except farm. 2 = clerical, sales, and kindred workers; craftsmen, foremen, and skilled workers; operatives and semiskilled workers; service workers; farm owners, tenants, and managers; Armed Forces. 3 = laborers and foremen. 4 = retired, unemployed, disabled; not part of the labor force.
* Significant at .05 level.
** Significant at .01 level.

category 3 (laborer) in Vermont. Group II North Carolina and Oklahoma youth in families with a laborer (category 3) as head-of-household showed no significant nutrition behavior change. In both states, Group II youth whose head-of-household was a cleri-

cal and/or service worker (category 2) or unemployed, disabled (category 4) showed significant nutrition behavior change. The eligibility standard set for youth to participate in the study limited the number of professional and managerial workers (category 1) as head-of-household. However, the 22 Group II Oklahoma youth in that category surpassed all other Group II youth in their state.

Participation of Homemaker in EFNEP

The data in Table 23 show that both Group I and Group II youth experienced significant nutrition behavior change, regardless of homemaker's participation in EFNEP. Hence, homemaker's participation in EFNEP appeared to have no relation to the nutrition behavior change that occurred among youth in the states and groups represented. The combined change score for EFNEP learners was larger than for non-EFNEP youth (7.59 and 5.54, respectively).

Table 23. Nutrition behavior change ($\bar{d}$) in youth taught the Lesson Series in North Carolina, Oklahoma, and Vermont, by group, state, and homemaker's participation in the EFNEP[1]

Participation in EFNEP	Group I (N = 330)			Group II (N = 241)[2]			Combined (N = 571)[3]		
	N	$\bar{d}$	$s_{\bar{d}}$	N	$\bar{d}$	$s_{\bar{d}}$	N	$\bar{d}$	$s_{\bar{d}}$
North Carolina									
Yes	73	7.70**	.87	29	4.59**	1.39	102	6.81**	.74
No	52	11.52**	1.04	95	4.33**	.77	147	6.87**	.62
Total	125	9.29**	.67	124	4.39**	.67	249	6.85**	.47
Oklahoma									
Yes	86	8.99**	.81	3	0.00	4.32	89	8.69**	.79
No	40	8.48**	1.18	114	2.98**	.70	154	4.41**	.60
Total	126	8.83**	.67	117	2.91**	.60	243	5.98**	.48
Vermont									
Yes	13	6.00*	2.07	0	—	—	13	6.00*	2.07
No	66	5.23**	.92	0	—	—	66	5.23**	.92
Total	79	5.35**	.84	0	—	—	79	5.35**	.84
Combined									
Yes	172	8.22**	.57	32	4.16**	1.33	204	7.59**	.53
No	158	8.12**	.60	209	3.59**	.52	367	5.54**	.39
Total	330	8.17**	.41	241	3.67**	.48	571	6.27**	.31

[1] No data available from Minnesota.
[2] No Group II in Vermont.
[3] Discrepancy in totals due to "no response."
* Significant at .05 level.
** Significant at .01 level.

6. *A Profile of the Teachers Who Participated in the Project*

This section describes the teachers who participated in the research project. The teacher variables that formed the basis for the description were: type of teacher, age, sex, education, income, and socioeconomic status.

Three types of teachers participated in this research project—volunteers, aides, and classroom teachers. The data in Table 24 show the frequency distribution of these teachers, by state.

Table 24. Frequency distribution of teachers, by state and type

State	Type of teacher							
	Volunteer		Aide		Classroom teacher		Total	
	N	%	N	%	N	%	N	%
Minnesota	31	75.6	10	24.4	0	0.0	41	37.3
North Carolina	0	0.0	10	66.7	5	33.3	15	13.6
Oklahoma	13	36.1	23	63.9	0	0.0	36	32.7
Vermont	8	44.4	10	55.6	0	0.0	18	16.4
Total	52	47.3	53	48.2	5	4.5	110	100.0

Among the 41 Minnesota teachers, three-fourths were volunteers and one-fourth aides. North Carolina's 15 teachers were two-thirds aides and the remainder were classroom teachers. No volunteers were in the teaching role in that state. Oklahoma's 36 teachers were aides (64 percent) and volunteers (36 percent). No classroom teachers were in the teacher role in Minnesota, Oklahoma, and Vermont. The 18 Vermont teachers were predominately aides (55.6 percent). Volunteers and aides represented 95.5 percent of the teachers involved in the study, with the two types being fairly evenly distributed (47.3 and 48.2 percent, respectively).

A profile of the teachers by group taught and selected characteristics appears in Table 25. Of the 71 Group I teachers representing all four states, 67.6 percent were aides. Although the aides represented all age groups—18 years or less to 46 or more—a majority (93.7 percent) were over 25 years of age, white (52.1 percent) and all were female. Aides also represented all educational categories (8th grade or less to graduate work) and income levels ($999 or less to $15,000 or more). A majority (85.3 percent) were in the educational range of 1-3 years of high school to 1-3 years of college. Of these three categories, the largest group (37.5 percent) were high school graduates. The remainder were fairly evenly distributed among the other two educational categories. The largest number representing an income category was 33.3 percent in the $5000-6999 income range.

The remaining 32.4 percent of the Group I teachers were volunteers, representing Minnesota, Oklahoma, and Vermont, and all

age groups. The majority (69.6 percent) were under 36 years of age (with 75 percent of those being less than 26 years of age), white (65.3 percent) and females (95.7 percent). All educational and income levels were represented among the volunteers, but the majority (52.3 percent) had less than a high school education. Sixty-five percent of the volunteers were in the $3000-6999 income range.

The 39 Group II teachers were volunteers (74 percent), aides (13 percent), and classroom teachers (13 percent). The 29 Group II teachers who were volunteers were high school students from Minnesota. The only information available on this group was that they were all 18 years of age or less, 72.4 percent were females, and all were in the 1-3 years of high school education category. Eighty percent of the aides were over 35 years of age, 80 percent were black, and all were females. Sixty percent were either high school graduates or had some college education, and were in the $5000-6999 income bracket. The majority (60 percent) of the five classroom teachers in the Group II teaching role were over 45 years of age and black. All were females, 80 percent were college graduates, with the remainder having done some graduate work. Income range for 60 percent of the classroom teachers was between $12,000 and $15,000 or more.

Thus, one might say that the typical Group I teacher was a white female aide who was over 35 years of age, a high school graduate, with an annual income of $5000-6999. The typical Group II teacher was a high school volunteer about whom little information was available. The Group II aides in the teacher role were typically black females, over 35 years of age, at least high school graduates, within the $5000-6999 income bracket.

7. *Relationship of Selected Teacher Characteristics to Nutrition Behavior Change*

An objective of the research project was to determine if the nutrition behavior change that occurred in the youth taught the Lesson Series was related to selected teacher characteristics. A separate multiple regression for each teacher characteristic was used to perform an analysis of variance to establish the F-values for significance of each characteristic and its possible interaction with state and group. These data are presented in Table 26.

The data in Table 26 indicate that the teacher characteristics of type of teacher, educational level, and socioeconomic status (income/education levels) were significantly related to nutrition behavior change. Significant interaction by state and by group also were indicated for all six teacher characteristics. Further analysis was made to determine differences that might be attributable to interactions of those two factors with nutrition behavior change.

Table 25. Frequency distribution of teachers, by group, type of teacher, and selected sociocultural characteristics.

Characteristic	Group I (N = 71)[1]				Group II (N = 39)[2]						Total (N = 110)	
	Aide		Volunteer		Aide		Volunteer		Classroom teacher			
	N	%	N	%	N	%	N	%	N	%	N	%
Age, yr:												
18 or less	1	2.1	6	26.1	0	0.0	29	100.0	0	0.0	36	32.7
19-25	2	4.2	6	26.1	0	0.0	0	0.0	0	0.0	8	7.2
26-35	11	22.9	4	17.4	1	20.0	0	0.0	0	0.0	16	14.5
36-45	17	35.4	3	13.0	2	40.0	0	0.0	2	40.0	24	21.8
46 or more	17	35.4	4	17.4	2	40.0	0	0.0	3	60.0	26	23.6
Total	48	100.0	23	100.0	5	100.0	29	100.0	5	100.0	110	100.0
Race:												
White	25	52.1	15	65.3	0	0.0	0	0.0	2	40.0	42	38.2
Black	21	43.7	7	30.4	4	80.0	0	0.0	3	60.0	35	31.8
Other	1	2.1	1	4.3	1	20.0	0	0.0	0	0.0	3	2.7
No response	1	2.1	0	0.0	0	0.0	29	100.0	0	0.0	30	27.3
Total	48	100.0	23	100.0	5	100.0	29	100.0	5	100.0	110	100.0
Sex:												
Male	0	0.0	1	4.3	0	0.0	8	27.6	0	0.0	9	8.2
Female	48	100.0	22	95.7	5	100.0	21	72.4	5	100.0	101	91.8
Total	48	100.0	23	100.0	5	100.0	29	100.0	5	100.0	110	100.0
Education[3]:												
A	2	4.2	4	17.4	0	0.0	0	0.0	0	0.0	35	31.8
B	10	20.8	8	34.9	1	20.0	29	100.0	0	0.0	19	17.3
C	18	37.5	3	13.0	1	20.0	0	0.0	0	0.0	22	20.0
D	13	27.0	2	8.7	2	40.0	0	0.0	0	0.0	17	15.4
E	2	4.2	1	4.3	0	0.0	0	0.0	4	80.0	7	6.4
F	2	4.2	4	17.4	1	20.0	0	0.0	1	20.0	8	7.3
No response	1	2.1	1	4.3	0	0.0	0	0.0	0	0.0	2	1.8
Total	48	100.0	23	100.0	5	100.0	29	100.0	5	100.0	110	100.0

Income/yr[4]												
$999 or less	2	4.2	1	4.3	0	0.0	0	0.0	0	0.0	3	2.7
1	4	8.3	3	13.1	0	0.0	0	0.0	0	0.0	7	6.4
2	8	16.7	8	34.9	3	60.0	0	0.0	0	0.0	19	17.3
3	16	33.3	7	30.4	0	0.0	0	0.0	0	0.0	23	20.9
4	2	4.2	2	8.7	0	0.0	0	0.0	1	20.0	5	4.5
5	2	4.2	0	0.0	1	20.0	0	0.0	1	20.0	4	3.6
6	4	8.3	0	0.0	1	20.0	0	0.0	1	20.0	6	5.5
7	3	6.2	1	4.3	0	0.0	0	0.0	2	40.0	6	5.5
No response	7	14.6	1	4.3	0	0.0	29	100.0	0	0.0	37	33.6
Total	48	100.0	23	100.0	5	100.0	29	100.0	5	100.0	110	100.0

[1] Group I had no classroom teachers.
[2] North Carolina, Oklahoma, and Minnesota only.
[3] A = 8th grade or less; B = 1-3 yr high school; C = high school graduate; D = 1-3 yr college; E = college graduate; F = graduate work.
[4] 1 = $1000-2999; 2 = $3000-4999; 3 = $5000-6999; 4 = $7000-9999; 5 = $10,000-11,999; 6 = $12,000-14,999; 7 = $15,000 or more.

Table 26. Summary of teacher characteristics and their relationship to nutrition behavior change, by state and group (N = 891 youth)

Teacher characteristic	df[1]	F-values for variables (ANOVA)			
		State	Group[2]	State* Group[2]	i
Type of teacher	2	2.64*	106.60**	.36	2.65*
Age	3	2.63*	106.58**	.36	2.04
Sex	1	2.62*	106.11**	.36	.24
Education	1	2.73*	106.11**	.26	14.62**
Income	1	2.68*	104.39**	.26	.03
Socioeconomic status	1	2.75*	107.04**	.27	9.08**

[1] For i variable.
[2] No Group II in Vermont.
* Significant at .05 level.
** Significant at .01 level.

Type of Teacher

Analysis of variance (Table 26) revealed a significant relationship between type of teacher and nutrition behavior change, and indicated interactions by state and group. However, the treatment was confined to comparing the total teacher sample by type of teacher. Comparisons of the effectiveness of the three types of teachers, as measured by the difference in mean pretest/posttest scores of the youth they taught, appear in Table 27.

Table 27. Nutrition behavior change ($\bar{d}$) in youth taught the Lesson Series, by type of teacher[1]

Type of teacher	Number of teachers	Mean score				
		N	Pre	Post	$\bar{d}$	$s_{\bar{d}}$
Volunteer	52	209	35.44	40.40	4.96**	.52
Aide	53	610	33.83	40.96	7.13**	.31
Classroom teacher	5	72	34.18	36.99	2.81**	.89
Total	110	891	34.23	40.51	6.28**	.54

[1] Combined groups and states.
** Significant at .01 level.

Regardless of teacher type, the youth taught the Lesson Series showed a highly significant nutrition behavior change. The youth taught by aides showed a greater change than those taught by volunteers ($\bar{d} = 7.13$ and 4.96, respectively). This is to be expected, since the aides were paraprofessionals who were presumed to have had prior training in conducting the Series. Yet, the volunteers, who had received considerably less training, effected a greater nutrition behavior change in the youth they taught than did the classroom teachers, who had received about the same

amount of training in conducting the Series as the volunteers ($\bar{d}$ = 4.96 and 2.81, respectively).

Teacher's Age

Analysis of variance (Table 26) revealed no significant relationship between teacher's age and nutrition behavior change, but a highly significant interaction between group and age. When compared by teacher's age (Table 28), Group I youth in all four states showed greater nutrition behavior change than Group II youth, except in Oklahoma's 26-35 teacher age group.

The data in Table 28 indicate considerable variation among teacher age categories in the four states. The largest mean difference scores occurred in Minnesota and Oklahoma Group I youth when their teachers were over 35 years of age and in Vermont when the teachers were 19-25 or 46 or more years of age. North Carolina Group I youth showed the greatest change when their teachers were 26-35. When the states were combined, youth taught by teachers over 35 years of age showed a greater nutrition behavior change than those taught by younger teachers.

Wide variations existed among Group II teachers. All of the Minnesota teachers were 18 years of age or less, the North Carolina teachers were all 36 years of age or more, and none of the Oklahoma teachers were less than 26 years of age. Thus, the basis for comparison between states was limited. Nevertheless, the Minnesota teachers (high school volunteers), who were all less than 19 years of age, effected a nutrition behavior change in the youth they taught which compared favorably with that of the 26-35 age category in Oklahoma and the over 46 category in North Carolina. Other age categories of Group II teachers represented effected nutrition behavior change of little or no significance in the youth they taught.

Teacher's Sex

As shown in Table 25, 92 percent of the teachers were females, thus limiting comparisons between the sexes. Only one male volunteer taught Group I youth, and eight taught Group II youth. The Vermont Group I youth taught by a male teacher showed only a slight change (Table 29). The Minnesota Group II youth taught by male volunteers showed a greater mean difference score than those taught by their female counterparts ($\bar{d}$ = 5.47 and 3.57, respectively). When combined by groups and states, female teachers effected a greater nutrition behavior change in the youth they taught than the male teachers ($\bar{d}$ = 6.43 and 4.00, respectively).

Table 28. Nutrition behavior change ($\bar{d}$) in youth taught the Lesson Series, by group, state, and teacher's age

Age yr	Group I (N = 492)			Group II (N = 399)[1]			Combined (N = 891)		
	N	$\bar{d}$	$s_{\bar{d}}$	N	$\bar{d}$	$s_{\bar{d}}$	N	$\bar{d}$	$s_{\bar{d}}$
Minnesota									
18 or less	0	–	–	147	4.36**	.62	147	4.36**	.62
19-25	11	5.28**	2.28	0	–	–	11	5.82**	2.28
26-35	0	–	–	0	–	–	0	–	–
36-45	80	10.30**	.85	0	–	–	80	10.30**	.85
46 or more	35	10.00**	1.28	0	–	–	35	10.00**	1.28
Total	126	9.82**	.67	147	4.36**	.62	273	6.88**	.84
North Carolina									
18 or less	0	–	–	0	–	–	0	–	–
19-25	0	–	–	0	–	–	0	–	–
26-35	33	11.30**	1.32	0	–	–	33	11.30**	1.32
36-45	37	6.65**	1.24	55	2.44**	1.02	92	4.13**	.79
46 or more	59	9.66**	.98	75	5.37**	.87	134	7.26**	.65
Total	129	9.21**	.67	130	4.13**	.66	259	6.66**	.47
Oklahoma									
18 or less	2	−2.00	5.34	0	–	–	2	−2.00	5.34
19-25	0	–	–	0	–	–	0	–	–
26-35	47	4.47**	1.10	40	5.68**	1.20	87	5.02**	.81
36-45	30	13.90**	1.38	63	1.27	.95	93	5.34**	.78
46 or more	52	10.06**	1.05	19	1.21	1.73	71	7.69**	.89
Total	131	8.74**	1.21	122	2.70**	1.01	253	5.83**	.89
Vermont									
18 or less	0	–	–	0	–	–	0	–	–
19-25	41	7.05**	1.18	0	–	–	41	7.05**	1.18
26-35	34	1.45	1.30	0	–	–	34	1.45	1.30
36-45	24	4.46**	1.54	0	–	–	24	4.46**	1.54
46 or more	7	7.29**	2.85	0	–	–	7	7.29**	2.85
Total	106	4.68**	.73	0	–	–	106	4.68**	.73
Combined									
18 or less	2	−2.00	5.34	147	4.36**	.62	149	4.28**	.62
19-25	52	6.79**	1.05	0	–	–	52	6.79**	1.05
26-35	114	5.55**	.71	40	5.68**	1.20	154	5.58**	.61
36-45	171	9.32**	.58	118	1.81**	.70	289	6.25**	.44
46 or more	153	9.76**	.61	94	4.53**	.78	247	7.78**	.48
Total	492	8.27**	.34	399	3.78**	.38	891	6.26**	.25

[1] North Carolina, Oklahoma, and Minnesota only.
** Significant at .01 level.

Teacher's Educational Level

Teachers' educational levels ranged from 8th grade or less to graduate work. For analytical purposes, the three categories of

8th grade or less, 1-3 years of high school, and high school graduate were collapsed and designated as "lower" education level. The remaining three categories—1-3 years college, college graduate, and graduate work—were designated as "higher" education level. Analysis of variance (Table 26) revealed a highly significant relationship between nutrition behavior change and teacher's educational level, and indicated interactions by state and group.

Table 29. Nutrition behavior change ($\bar{d}$) in youth taught the Lesson Series, by group, state, and teacher's sex

Sex	Group I (N = 492)			Group II (N = 399)[1]			Combined (N = 891)		
	N	$\bar{d}$	$s_{\bar{d}}$	N	$\bar{d}$	$s_{\bar{d}}$	N	$\bar{d}$	$s_{\bar{d}}$
Minnesota									
Male	0	—	—	45	5.47**	1.13	45	5.47**	1.13
Female	126	9.82**	.68	102	3.88**	.78	228	7.21**	.51
Total	126	9.82**	.68	147	4.36**	.69	273	6.88**	.47
North Carolina									
Male	0	—	—	0	—	—	0	—	—
Female	129	9.21**	.67	130	4.13**	.66	259	6.66**	.47
Total	129	9.21**	.67	130	4.13**	.66	259	6.66**	.47
Oklahoma									
Male	0	—	—	0	—	—	0	—	—
Female	131	8.74**	.66	122	2.70**	.69	253	5.83**	.48
Total	131	8.74**	.66	122	2.70**	.69	253	5.83**	.48
Vermont									
Male	19	.53	1.74	0	—	—	19	.53	1.74
Female	87	5.59**	.81	0	—	—	87	5.59**	.81
Total	106	4.68**	.74	0	—	—	106	4.68**	.74
Combined									
Male	19	.53	1.74	45	5.47**	1.13	64	4.00**	.95
Female	473	8.57**	.35	354	3.57**	.40	827	6.43**	.27
Total	492	8.26**	.34	399	3.78**	.38	891	6.25**	.25

[1] North Carolina, Oklahoma, and Minnesota only.
** Significant at .01 level.

Among Group I teachers in North Carolina, Oklahoma, and Vermont, higher education level teachers effected a greater nutrition behavior change in the youth they taught than did lower education level teachers, whereas in Minnesota the reverse was true (Table 30). When all Groups I were combined, the mean difference score was still in favor of higher education level teachers ($\bar{d}$ = 8.80 and 7.77, respectively).

Comparisons for Group II by state were limited. As shown in Table 30, Minnesota had no higher education level teachers, North

Carolina had no lower education level teachers, and Vermont had no Group II. Thus, Oklahoma was the only state within which a comparison could be made. In Oklahoma the higher education level teachers effected a highly significant change in the youth they taught as compared to a nonsignificant change for the lower education level teachers.

Table 30. Nutrition behavior change ($\bar{d}$) in youth taught the Lesson Series, by group, state, and teacher's educational level

Level of education[2]	Group I (N = 492)			Group II (N = 399)[1]			Combined (N = 891)		
	N	$\bar{d}$	$s_{\bar{d}}$	N	$\bar{d}$	$s_{\bar{d}}$	N	$\bar{d}$	$s_{\bar{d}}$
Minnesota									
Higher	48	9.54**	1.08	0	—	—	48	9.54**	1.08
Lower	78	10.00**	.84	147	4.37**	.62	225	6.32**	.50
Total	126	9.83**	.67	147	4.37**	.62	273	6.89**	.45
North Carolina									
Higher	69	10.33**	.90	130	4.13**	.66	199	6.28**	.53
Lower	60	7.93**	.97	0	—	—	60	7.93**	.97
Total	129	9.22**	.66	130	4.13**	.66	259	6.66**	.47
Oklahoma									
Higher	43	12.49**	1.14	79	3.77**	.84	122	6.84**	.68
Lower	88	6.92**	.80	43	.74	1.14	131	4.89**	.66
Total	131	8.75**	.66	122	2.70**	.68	253	5.83**	.47
Vermont									
Higher	80	5.04**	.84	0	—	—	80	5.04**	.84
Lower	26	3.58**	1.47	0	—	—	26	3.58**	1.47
Total	106	4.68**	.73	0		—	106	4.68**	.73
Combined									
Higher	240	8.80**	.48	209	4.00**	.52	449	6.56**	.35
Lower	252	7.77**	.47	190	3.55**	.54	442	5.96**	.36
Total	492	8.27**	.34	399	3.78**	.38	891	6.26**	.25

[1] North Carolina had no lower education Group II teachers, Minnesota had no higher education level Group II teachers, and Vermont had no Group II.

[2] Higher level of education includes some college, college graduate, and graduate work; lower level of education includes high school graduate or less.

** Significant at .01 level.

When combined groups were compared, only the North Carolina lower education level teachers exceeded the higher education level teachers ($\bar{d} = 7.93$ and 6.28, respectively). Yet, when groups and states were combined, the higher education level teacher exceeded her lower education level counterpart ($\bar{d} = 6.56$ and 5.96, respectively).

Teacher's Income Level

As with education levels, income levels were collapsed and

designated as "higher" and "lower." The lower income level included teachers whose annual income was $6999 or less; higher income level included those whose annual incomes were $7000 or more. The effect of teachers' income level on the nutrition behavior change that occurred in the youth they taught is shown in Table 31.

In comparing the effect of Group I teachers' income levels on the nutrition behavior change that occurred in the youth they taught by state (Table 31), the lower income teachers surpassed the higher income teachers only in North Carolina. However, when the states were combined for Group I, and the effects of income level were compared, lower income level teachers exceeded their higher income counterparts ($\bar{d}$ = 8.51 and 7.20, respectively).

Comparisons among Group II teachers were limited to North Carolina and Oklahoma, since there was no higher income cate-

Table 31. Nutrition behavior change ($\bar{d}$) in youth taught the Lesson Series, by group, state, and teacher's income level

Income level[2]	Group I (N = 492)			Group II (N = 399)[1]			Combined (N = 891)		
	N	$\bar{d}$	$s_{\bar{d}}$	N	$\bar{d}$	$s_{\bar{d}}$	N	$\bar{d}$	$s_{\bar{d}}$
Minnesota									
Higher	6	13.83**	3.09	0	—	—	6	13.83**	3.09
Lower	120	9.62**	.69	147	4.36**	.62	267	6.73**	.46
Total	126	9.82**	.67	147	4.36**	.62	273	6.89**	.46
North Carolina									
Higher	20	5.25**	1.69	72	2.81**	.89	92	3.33**	.79
Lower	109	9.94**	.72	58	5.78**	.99	167	8.50**	.59
Total	129	9.21**	.67	130	4.13**	.66	259	6.66**	.47
Oklahoma									
Higher	35	8.77**	1.28	40	5.68**	1.20	75	7.12**	.87
Lower	96	8.74**	.77	82	1.26	.83	178	5.29**	.57
Total	131	8.74**	.66	122	2.70**	.68	253	5.83**	.48
Vermont									
Higher	29	5.28**	1.40	0	—	—	29	5.28**	1.40
Lower	77	4.46**	.86	0	—	—	77	4.46**	.86
Total	106	4.68**	.73	0	—	—	106	4.68**	.73
Combined									
Higher	90	7.20**	.80	112	3.83**	.71	202	5.33**	.53
Lower	402	8.51**	.38	287	3.76**	.45	689	6.53**	.29
Total	492	8.27**	.34	399	3.78**	.38	891	6.26**	.25

[1] Minnesota had no higher income Group II teachers; Vermont had no Group II.
[2] Higher income = $7000 or more/yr; lower income = $6999 or less/yr.
** Significant at .01 level.

gory in Minnesota and no Group II teachers in Vermont. As with Group I, North Carolina Group II lower income versus higher income teachers effected a greater change in the youth they taught, whereas, the reverse was true in Oklahoma. Yet, when all Groups II youth were combined, the higher income teacher exceeded the lower income teacher ($\bar{d} = 3.83$ and 3.76, respectively). When groups and states represented were combined, the lower income teacher exceeded the higher income teacher ($\bar{d} = 6.53$ and 5.33, respectively).

Teacher's Socioeconomic Status

One objective of this study was to determine whether the socioeconomic status (income/education levels) of the teachers was related to the nutrition behavior change that occurred in the youth they taught. This test was to ascertain the effectiveness of the indigenous teacher as compared with the middle-class teacher as measured by the difference in mean pretest/posttest scores of the youth they taught. Utilizing the income/education levels designated in Tables 31 and 32, income/education levels were grouped into four categories: higher income/higher education level, higher income/lower education level, lower income/higher education level, and lower income/lower education level. Analysis of variance (Table 26) showed a significant relationship between the dependent variable, nutrition behavior change, and the independent variable, socioeconomic status. The data also indicated interactions by group and by state.

The data in Table 32 indicate that the lower income teachers taught 81.7 percent of the Group I youth, 72 percent of Group II, for a total of 77 percent of the 891 youth who were taught the Lesson Series. The lower/lower category teachers taught 43.7 percent of the youth in Group I, 47.6 percent in Group II, for a combined total of 405 youth taught by lower/lower category teachers. The higher income teachers taught 18 percent of Group I youth, 28 percent of Group II youth, for a total of only 23 percent of the 891 youth who were taught the Lesson Series. This disproportionate distribution among the teachers held true in each group, in each state, and for each state when the groups were combined.

In addition, among Group I teachers, Minnesota had none in the higher/lower category, and North Carolina had none in the higher/higher category. Among the Group II teachers in the states represented, there were no higher/lower in Minnesota, North Carolina, and Oklahoma, and no lower/higher category in Minnesota.

The only way a comparison could be made was to compute the combined mean difference score for all groups taught by higher/

higher and higher/lower teachers and thus determine the nutrition behavior change effected by all teachers in those two categories. The same procedure was used for all lower/higher and all lower/lower teachers. The 202 youth taught by higher/higher and/or higher/lower teachers showed a combined mean difference score of 5.33; whereas, the 689 youth taught by lower/higher and/or lower/lower teachers showed a combined mean difference of 6.53. Thus, where she taught, and teaching the larger proportion of the youth participants, the indigenous teacher excelled over the middle-class teacher, averaged over education levels.

Table 32. Nutrition behavior change ($\bar{d}$) in youth taught the Lesson Series, by group, state, and teacher's socioeconomic status (income/education levels)

Socioeconomic status[3]	Group I (N = 492)[1]			Group II (N = 399)[2]			Combined (N = 891)		
	N	$\bar{d}$	$s_{\bar{d}}$	N	$\bar{d}$	$s_{\bar{d}}$	N	$\bar{d}$	$s_{\bar{d}}$
Minnesota									
Higher/higher	6	13.83**	3.06	0	—	—	6	13.83**	3.06
Higher/lower	0	—	—	0	—	—	0	—	—
Lower/higher	42	8.93**	1.16	0	—	—	42	8.93**	1.16
Lower/lower	78	10.0**	.85	147	4.37	.62	225	6.32**	.50
North Carolina									
Higher/higher	0	—	—	72	2.81**	.88	72	2.81**	.88
Higher/lower	20	5.25**	1.68	0	—	—	20	5.25**	1.68
Lower/higher	69	10.33**	.90	58	5.78**	.98	127	8.25**	.67
Lower/lower	40	9.28**	1.19	0	—	—	40	9.28**	1.19
Oklahoma									
Higher/higher	22	11.91**	1.60	40	5.68**	1.19	62	7.89**	.95
Higher/lower	13	3.46*	2.08	0	—	—	13	3.46*	2.08
Lower/higher	21	13.09**	1.64	39	1.82	1.20	60	5.77**	.97
Lower/lower	75	7.52**	.87	43	.74	1.14	118	5.05**	.69
Vermont									
Higher/higher	25	6.08**	1.50	0	—	—	25	6.08**	1.50
Higher/lower	4	.25	3.75	0	—	—	4	.25	3.75
Lower/higher	55	4.56**	1.01	0	—	—	55	4.56**	1.01
Lower/lower	22	4.18**	1.60	0	—	—	22	4.18**	1.60
Combined									
Higher/higher	53	9.38**	1.03	112	3.83**	.71	165	5.61**	.58
Higher/lower	37	4.08**	1.23	0	—	—	37	4.08**	1.23
Lower/higher	187	8.63**	.55	97	4.18**	.76	284	7.11**	.45
Lower/lower	215	8.41**	.51	190	3.55**	.54	405	6.13**	.37

[1] North Carolina had no higher/higher Group I teachers; Minnesota had no higher/lower Group I teachers.

[2] North Carolina and Oklahoma had no higher/lower Group II teachers; Minnesota had only lower/lower Group II teachers; Vermont had no Group II.

[3] Higher/higher = $7000/yr or more/1-3 yr college or more; higher/lower = $7000/yr or more/high school graduate or less; lower/higher = $6999/yr or less/1-3 yr college or more; lower/lower = $6999/yr or less/high school graduate or less.

* Significant at .05 level.

** Significant at .01 level.

8. *Relationship of Factors in the Teaching/Learning Environment to Nutrition Behavior Change*

A multiple regression for each teaching/learning environment factor was used to perform an ANOVA to establish the F-value for significance of each factor and its possible interactions with state and group. The results of the ANOVA and of nutrition behavior change for teaching/learning environment factors appear in Table 33. Data indicate a significant relationship for all the teaching/learning environment factors except group size. The data also indicate interactions by state and group.

Table 33. Summary of the relationship of factors in the teaching/learning environment and nutrition behavior change, by state and group (N = 891 youth)

Teaching/learning environment factors	F-values for variables (ANOVA)				
	df[1]	State	Group[2]	State* Group[2]	i
Group size	2	2.68*	104.40**	.26	.58
Teaching/learning setting	3	2.73*	106.17**	.26	5.71**
Lesson time frame	2	2.71*	105.46**	.26	5.03**
Lesson frequency	2	2.76*	107.30**	.27	12.83**

[1] For i variable.
[2] No Group II in Vermont.
* Significant at .05 level.
** Significant at .01 level.

Group Size

According to the lesson design, the ideal group size for the Lesson Series is preferably 6 to 10 youth. Group I in this research project was to be the informal, Extension type group having a maximum of 10 youth; Group II, added for comparison, was to be in the formal or classroom type setting with 10 to 30 youth. The F-values presented in Table 33 revealed no relationship between group size and nutrition behavior change, but indicated interactions by state and group.

The data in Table 34 show that 47.1 percent of the Group I youth were taught in groups of 11-15 youth, and 21.3 percent of the Group II youth were taught in groups of 10 or less. They further show that, regardless of group size or state, all groups attained a highly significant nutrition behavior change. When comparing Group I youth, it was noted that Minnesota and Oklahoma youth in groups of 10 or less excelled, whereas North Carolina and Vermont youth in groups of 11-15 excelled. Yet, when all Groups I were combined, the mean difference score indicated that those youth in groups of 11-15 experienced greater nutrition behavior change ($\bar{d} = 8.47$ and 8.09, respectively). Com-

parisons among Group II youth were extremely limited, as Minnesota taught 58.5 percent of its Group II youth in groups of 10 or less, the remainder being in groups of 11-15; North Carolina taught all Group II youth in 11-15 group sizes; Oklahoma groups

Table 34. Nutrition behavior change ($\bar{d}$) in youth taught the Lesson Series, by group, state, and group size.

Group size	Group I (N = 492)			Group II (N = 399)[1]			Combined (N = 891)		
	N	$\bar{d}$	$s_{\bar{d}}$	N	$\bar{d}$	$s_{\bar{d}}$	N	$\bar{d}$	$s_{\bar{d}}$
Minnesota									
10 or less	61	9.93**	.97	85	4.71**	.82	146	6.89**	.63
11-15	65	9.72**	.94	62	3.90**	.96	127	6.88**	.67
16 or more	0	—	—	0	—	—	0	—	—
Total	126	9.82**	.67	147	4.36**	.62	273	6.89**	.46
North Carolina									
10 or less	72	8.36**	.89	0	—	—	72	8.36**	.89
11-15	57	10.30**	1.00	130	4.13**	.66	187	6.01**	.55
16 or more	0	—	—	0	—	—	0	—	—
Total	129	9.22**	.67	130	4.13**	.66	259	6.66**	.47
Oklahoma									
10 or less	63	10.01**	.95	0	—	—	63	10.01**	.95
11-15	68	7.57**	.92	0	—	—	68	7.57**	.92
16 or more	0	—	—	122	2.70**	.68	122	2.70**	.68
Total	131	8.75**	.66	122	2.70**	.68	253	5.83**	.48
Vermont									
10 or less	64	4.12**	.95	0	—	—	64	4.12**	.95
11-15	42	5.51**	1.17	0	—	—	42	5.51**	1.17
16 or more	0	—	—	0	—	—	0	—	—
Total	106	4.67**	.73	0	—	—	106	4.67**	.73
Combined									
10 or less	260	8.09**	.47	85	4.71**	.82	345	7.26**	.41
11-15	232	8.47**	.50	192	4.06**	.55	424	6.47**	.52
16 or more	0	—	—	122	2.70**	.68	122	2.70**	.68
Total	492	8.27**	.34	399	3.78**	.38	891	6.26**	.25

[1] North Carolina used only the 11-15 group size, Oklahoma used only the 16 or more group size, Minnesota had no 16 or more group size, and Vermont had no Group II.
** Significant at .01 level.

were all 16 or more youth; and Vermont had no Group II youth. However, when all group sizes represented were combined, Group II youth taught in groups of 10 or less showed mean difference scores that were greater than for the 11-15 group size ($\bar{d} = 4.71$ and 4.06, respectively). When all group sizes represented in Groups I and II in all states were combined, the mean difference score for groups of 10 or less was higher than for the 11-15

groups ($\bar{d} = 7.26$ and 6.47, respectively) and higher than for the 16 or more group size ($\bar{d} = 7.26$ and 2.70, respectively).

Teaching/Learning Setting

According to the Lesson Series design, the home and/or community center were considered the ideal place to teach the lessons. Analysis of variance (Table 33) revealed a significant relationship between teaching/learning setting and nutrition behavior change, and indicated interactions by group and state.

The youth groups in this research project met in homes, community centers, schools, and other places, such as in churches and organized groups. North Carolina Groups I met only in homes and community centers, whereas the other three states utilized all four teaching/learning settings (Table 35). Group II youth, meeting in formal, organized groups, were taught almost entirely in school settings in Minnesota and Oklahoma, but almost 45 percent of the North Carolina Group II youth were taught in homes and community centers.

The greater nutrition behavior change occurred among Group I youth when they were taught in the home or community center setting, except in Vermont, where the youth appeared to be most successful in the school setting. When all Groups I were combined, the largest mean difference scores were noted among those youth taught in homes and community centers ($\bar{d} = 8.77$ and 9.98, respectively). Variations among the teaching/learning settings for Group II youth made comparisons difficult. Almost 45 percent of North Carolina Group II were taught in the informal setting of homes and community centers, whereas Minnesota and Oklahoma Group II youth were all taught in the formal school setting and Vermont had no Group II. Although 85.5 percent of the Group II youth were taught in the formal school setting, those taught in the informal settings of homes and community centers had considerably higher mean difference scores ($\bar{d} = 3.44$ versus 7.86 and 5.49, respectively). When all groups represented in all states were combined, the informal teaching/learning setting of the home and community center still effected the greatest nutrition behavior change in the youth participants.

Lesson Time Frame

The F-values in Table 33 revealed a significant relationship between lesson time frame and nutrition behavior change, and indicated interactions by group and state. The time frame categories were 45 minutes or less, 46-60 minutes, and 61 or more minutes. According to the Lesson Series design, the lessons should be taught a maximum of 45 minutes.

Table 35. Nutrition behavior change ($\bar{d}$) in youth taught the Lesson Series, by group, state, and teaching/learning setting

Teaching/ learning setting	Group I (N = 492)[1]			Group II (N = 399)[2]			Combined (N = 891)		
	N	$\bar{d}$	$s_{\bar{d}}$	N	$\bar{d}$	$s_{\bar{d}}$	N	$\bar{d}$	$s_{\bar{d}}$
Minnesota									
Home	36	10.94**	1.25	0	—	—	36	10.94**	1.25
Community center	41	9.76**	1.17	0	—	—	41	9.76**	1.17
School	22	9.13**	1.60	147	4.36**	.62	169	4.99**	.58
Other	27	9.00**	1.44	0	—	—	27	9.00**	1.44
Total	126	9.82**	.67	147	4.36**	.62	273	6.89**	.45
North Carolina									
Home	104	7.03**	.74	7	7.86**	2.83	111	7.08**	.71
Community center	25	18.32**	1.50	51	5.49**	1.05	76	9.71**	.86
School	0	—	—	72	2.81**	.88	72	2.81**	.88
Other	0	—	—	0	—	—	0	—	—
Total	129	9.21**	.66	130	4.13**	.66	259	6.66**	.47
Oklahoma									
Home	49	12.27**	1.07	0	—	—	49	12.27**	1.07
Community center	34	8.06**	1.29	0	—	—	34	8.06**	1.29
School	17	5.59**	1.82	122	2.70**	.68	139	3.06**	.64
Other	31	5.68**	1.35	0	—	—	31	5.68**	1.35
Total	131	8.75**	.66	122	2.70**	.68	253	5.83**	.47
Vermont									
Home	18	5.00**	1.77	0	—	—	18	5.00**	1.77
Community center	25	4.60**	1.50	0	—	—	25	4.60**	1.50
School	48	5.85**	1.08	0	—	—	48	5.85**	1.08
Other	15	.67	1.94	0	—	—	15	.67	1.94
Total	106	4.68**	.73	0	—	—	106	4.68**	.73
Combined									
Home	207	8.77**	.52	7	7.86**	2.83	214	8.74**	.51
Community center	125	9.98**	.67	51	5.49**	1.05	176	8.68**	.57
School	87	6.63**	.80	341	3.44**	.41	428	4.09**	.36
Other	73	5.88**	.88	0	—	—	73	5.88**	.88
Total	492	8.27**	.34	399	3.78**	.38	891	6.26**	.25

[1] All North Carolina Group I youth were taught in homes and community centers.
[2] None of the Group II youth were taught in the "other" category setting; all Oklahoma and Minnesota Group II youth were taught in the school setting. Vermont had no Group II; and North Carolina Groups II who met in homes and community centers were formal, organized groups meeting in an informal setting.
** Significant at .01 level.

The data in Table 36 show considerable variation in mean difference scores among Group I youth. The largest mean difference score among Minnesota and Oklahoma youth occurred when the lesson time frame was over one hour; among North Carolina youth in the 45 minutes or less; and among Vermont youth in the 46-60 minutes time frame. However, when all Group I youth were combined, the mean difference score for those in the over one hour time frame was higher than for those in the 45 minutes or less time frame ($\bar{d} = 9.72$ and 7.10, respectively). It should be noted,

Table 36. Nutrition behavior change ($\bar{d}$) in youth taught the Lesson Series, by group, state, and lesson time frame[1]

Lesson time frame[2] min	Group I (N = 492)			Group II (N = 399)[2]			Combined (N = 891)		
	N	$\bar{d}$	$s_{\bar{d}}$	N	$\bar{d}$	$s_{\bar{d}}$	N	$\bar{d}$	$s_{\bar{d}}$
Minnesota									
45 or less	25	7.40**	1.50	30	4.03**	1.37	55	5.56**	1.01
46-60	49	9.84**	1.08	117	4.45**	.70	166	6.04**	.58
61 or more	52	10.98	1.04	0	—	—	52	10.98	1.04
Total	126	9.82**	.67	147	4.37**	.62	273	6.89**	.46
North Carolina									
45 or less	5	17.40**	3.36	48	6.96**	1.09	53	7.94**	1.03
46-60	18	3.72*	1.78	68	2.97**	.91	86	3.13**	.81
61 or more	106	9.76**	.73	14	.07	2.01	120	8.63**	.69
Total	129	9.22**	.66	130	4.13**	.66	259	6.66**	.47
Oklahoma									
45 or less	43	8.79**	1.15	122	2.70**	.68	165	4.29**	.59
46-60	48	4.92**	1.09	0	—	—	48	4.92**	1.09
61 or more	40	13.30**	1.19	0	—	—	40	13.30**	1.19
Total	131	8.75**	.66	122	2.70**	.68	253	5.83**	.47
Vermont									
45 or less	36	3.44**	1.25	0	—	—	36	3.44**	1.25
46-60	35	6.94**	1.27	0	—	—	35	6.94**	1.27
61 or more	35	3.68**	1.27	0	—	—	35	3.68**	1.27
Total	106	4.68**	.73	0	—	—	106	4.68**	.73
Combined									
45 or less	109	7.10**	.72	200	3.93**	.53	309	5.05**	.43
46-60	150	6.85**	.61	185	3.91**	.55	335	5.23**	.41
61 or more	233	9.73**	.49	14	.07	2.01	247	9.18**	.48
Total	492	8.27**	.34	399	3.78**	.38	891	6.26**	.25

[1] Refers to length of time the group met, not to the time consumed in teaching either of the six lessons.

[2] Oklahoma Group II meetings were all for 45 minutes or less; Minnesota meetings did not last over 60 minutes; Vermont had no Group II.

* Significant at .05 level.

** Significant at .01 level.

however, that over 47 percent of all Group I youth were taught in the over one hour time frame as compared with only 23 percent in the 45 minutes or less time frame.

Among Group II youth, the only comparisons that could be made were within and between Minnesota and North Carolina, as all Oklahoma youth were taught in the 45 minutes or less time frame and there was no Group II in Vermont. In Minnesota, the youth taught in the 46-60 minutes time frame had the highest mean difference score. The difference in scores between this group and those youth in the 45 minutes or less time frame was slight ($\bar{d} = 4.45$ and 4.03, respectively), and to be expected, since they constituted 80 percent of all Minnesota Group II youth. In contrast, the mean difference score for North Carolina and Group II youth in the 45 minutes or less time frame far exceeded that of youth in the other two time frames. When all Groups II were combined, the representation among lesson time frame categories was the reverse of that for Group I; i.e., 50 percent of the Group II youth were taught in the 45 minutes or less time frame and attained the highest mean difference score; less than 4 percent were in the over one hour time frame and attained the lowest mean difference score. Yet, when all groups were combined, the greatest mean difference occurred among youth in the over one hour time frame ($\bar{d} = 9.18$), the next greatest among those in the 46-60 minutes time frame ($\bar{d} = 5.23$), and the smallest was among those in the 45 minutes or less time frame ($\bar{d} = 5.05$).

Lesson Frequency

Lesson frequency refers to the number of times per week the youth participants were taught the Lesson Series. Since the disadvantaged youth is thought to need constant reinforcement, it was assumed that the more often the group met, the greater would be the nutrition behavior change that occurred. The F-values in Table 33 revealed that lesson frequency was significantly related to nutrition behavior change, and indicated interactions by group and state. Three categories of lesson frequency were used in this study: once a week, twice a week, and three times a week.

According to Table 37, all Oklahoma Group II youth met twice a week, whereas Minnesota, North Carolina, and Vermont Groups I represented all three frequency categories. Among Group II youth, only those in North Carolina were represented in all three categories; Minnesota Group II youth met once a week, Oklahoma youth met twice a week, and Vermont had no Group II. These extreme variations made direct comparisons difficult. Since all of the youth groups, with the exception of Vermont Group I youth taught three or more times a week, attained highly significant

nutrition behavior change, consideration was given to interpreting the data according to mean difference scores attained by the individual groups.

The greatest mean difference scores attained by any of the groups were those by Group I youth in Minnesota and North Carolina who were taught three or more times a week ($\bar{d} = 11.80$ and 12.23, respectively); however, those youth represented only 8 percent of all Group I youth. When all Groups I were combined, youth taught once a week attained a greater mean difference score than those taught twice a week ($\bar{d} = 9.49$ and 7.78, respectively).

Table 37. Nutrition behavior change ($\bar{d}$) in youth taught the Lesson Series, by group, state, and lesson frequency

Meetings per week	Group I (N = 492)[1]			Group II (N = 399)[2]			Combined (N = 891)		
	N	$\bar{d}$	$s_{\bar{d}}$	N	$\bar{d}$	$s_{\bar{d}}$	N	$\bar{d}$	$s_{\bar{d}}$
Minnesota									
1	103	10.21**	.73	147	4.36**	.62	250	6.78**	.47
2	13	5.23**	2.07	0	—	—	13	5.23**	2.07
3 or more	10	11.80**	2.36	0	—	—	10	11.80**	2.36
Total	126	9.82**	.66	147	4.36**	.62	273	6.89**	.45
North Carolina									
1	27	10.26**	1.43	26	10.92**	1.46	53	10.58**	1.02
2	72	7.57**	.88	89	2.10**	.79	161	4.55**	.59
3 or more	30	12.23**	1.36	15	4.40**	1.93	45	9.62**	1.11
Total	129	9.22**	.66	130	4.13**	.65	259	6.66**	.46
Oklahoma									
1	0	—	—	0	—	—	0	—	—
2	131	8.75**	.65	122	2.70**	.68	253	5.83**	.47
3 or more	0	—	—	0	—	—	0	—	—
Total	131	8.75**	.65	122	2.70**	.68	253	5.83**	.47
Vermont									
1	35	6.74**	1.26	0	—	—	35	6.74**	1.26
2	36	5.58**	1.24	0	—	—	36	5.58**	1.24
3 or more	35	1.68	1.26	0	—	—	35	1.68	1.26
Total	106	4.68**	.72	0	—	—	106	.68**	.72
Combined									
1	165	9.49**	.58	173	5.35**	.57	338	7.37**	.41
2	252	7.78**	.47	211	2.45**	.52	463	5.35**	.35
3 or more	75	7.25**	.86	15	4.40**	1.93	90	6.78**	.79
Total	492	8.27**	.34	399	3.78**	.37	891	6.26**	.24

[1] All Group I youth in Oklahoma met twice a week.
[2] All Oklahoma Group II youth met twice a week; all Minnesota Group II youth met once a week; Vermont had no Group II.
** Significant at .01 level.

When all Groups II were combined, youth taught once a week attained a greater mean difference score than those taught twice or three or more times a week ($\bar{d} = 5.35$, 2.35, and 4.40, respectively).

When all groups were combined, a mean difference score of only .59 separated those taught once a week from those taught three or more times a week ($\bar{d} = 7.37$ and 6.78, respectively), and a mean difference score of 2.02 from those taught twice a week ($\bar{d} = 7.37$ and 5.35, respectively). Although youth taught once a week attained the greater mean difference score, the differential between them and those taught three or more times a week was relatively slight. However, when youth taught once a week were compared with those taught more often, the differential in favor of the once a week category was larger ($\bar{d} = 7.37$ and 5.35, respectively).

Teaching Strategies

The Lesson Series Leader's Guide suggested that learning activities for each lesson be selected by th · teacher. The teaching strategies used for each lesson were cor piled and are presented as a frequency distribution in Table 38. The majority of the Lesson Evaluations received indicated that three strategies or types of learning activities were utilized—reading, observation, and participation. The average number of Lesson Evaluations ($N = 101$) completed by teachers who used all three strategies in each lesson taught was 79 percent. In addition, youth participatory activities were included with another strategy—reading—by 8.75 percent and with observation by 7.26 percent of those reporting. Participatory activities alone were employed by only 0.66 percent of the 101 teachers completing the Lesson Evaluation forms. The use of reading and observation techniques separately or in combination with one or other strategy was very limited. Due to the inability to make comparisons of the nutrition behavior change that could be attributed to reading, observation, and/or participatory strategies, no conclusions could be drawn as to their effectiveness in producing nutrition behavior change in the youth. Apparently, the combination of the three strategies in each lesson was used successfully in both the informal and the classroom settings.

9. *Lesson Evaluation*

The teacher was to complete a Lesson Evaluation form for each lesson taught the youth. The purpose of this form was to describe the strengths and weaknesses of the lessons, i.e., the teachers' evaluation of the lessons and the activities, and their perception of the youth's actions in and reactions to each lesson.

Table 38. Frequency distribution of teaching strategies utilized for each lesson (N = 101 Lesson Evaluations)

Lesson	Single method used[1]			Two methods used			Three methods used
	REA	OBS	PAR	REA + OBS	REA + PAR	OBS + PAR	
	%	%	%	%	%	%	%
1	1.0	—	2.0	2.0	4.0	8.0	83.2
2	1.0	—	1.0	—	5.0	7.0	85.2
3	—	—	—	—	5.0	5.0	88.1
4	1.0	—	1.0	1.0	10.0	13.0	73.3
5	2.0	—	—	—	13.0	4.0	74.3
6	—	—	—	—	16.0	7.0	70.3
Avg use	0.8	—	0.7	0.5	8.8	7.3	79.0

[1] REA = reading—lesson read to youth, lecture; OBS = observation—demonstration, field trip, scientific experiment; PAR = participation—role play, discussion, group activity.

A majority of the teachers felt that the youth were interested in each of the six lessons taught (Table 39), understood the lessons, participated in most activities, and were interested in tasting new foods; 81 percent felt that the facilities were adequate for the activities suggested and used; and 78 percent reported that the youth were attentive. About 62 percent of the teachers reported hearing comments by the youth regarding trying foods prepared during the previous lesson.

Table 39. Percentage distribution of teachers' perception of youth's actions in and reactions to each lesson (N = 101 Lesson Evaluations)

Teacher comment	Lesson						Total avg
	1	2	3	4	5	6	
Youth were interested in lesson.	97	96	97	96	92	93	95.2
Lesson was understood by youth.	96	94	95	97	90	92	94.1
Youth were attentive.	78	82	78	78	79	75	78.5
Youth participated in most activities.	96	94	96	95	95	92	94.7
Youth were interested in tasting new foods.	91	90	90	91	87	90	89.9
If a food was prepared in the previous lesson, youth commented that they had tried the food.	—	51	68	65	63	61	62.0
Facilities were adequate for activities.	83	78	84	87	74	82	81.5
Total avg/lesson	91	84	87	87	83	84	

On the average, 43 percent of the teachers would teach the lessons in approximately the same way and 15.8 percent in the same

way but with more involvement of the youth (Table 40). Almost 28 percent of the teachers did not respond fully to one or more of the items related to the teaching strategies used with each lesson. However, of the total 101 teachers who completed Lesson Evaluation forms, only 6.7 percent would use a different teaching method and 4.5 percent would teach the lesson differently.

Table 40. Percentage distribution of teachers' evaluation of suggested teaching strategies for each lesson (N = 101 Lesson Evaluations)

Evaluation	Lesson						Total avg
	1	2	3	4	5	6	
Teach the same way.	45	52	40	47	37	36	42.9
Teach the same way, involve the youth more.	15	13	17	11	17	23	15.8
Use a different method.	11	7	9	4	7	3	6.7
Teach lesson differently.	7	3	5	4	5	3	4.5
Incomplete response.	22	25	30	34	35	36	30.8
Avg/lesson	20	19	17	17	16	16	

[1] Based on statement ("Yes" or "No" response): "If I taught this lesson again, I would: (1) use different activities, (2) involve the youth more in activities, (3) use similar activities, (4) teach the lesson similarly to the way I taught it this time, and (5) use a different method of teaching."

Table 41 presents a summary of the lesson objectives the teachers felt they achieved, the reasons that some of the objectives were not met, and the teaching strategies used for each of the first six lessons of the Lesson Series. Most of the teachers felt they met the objectives of the lessons, or if not, it was because there was not enough time to achieve all of the objectives. Most of the activities suggested in the Series were used at least once.

Table 41. Summary of evaluations for each lesson (N = 101 Lesson Evaluations)

Lesson	Evaluations	
	N	%
1. SUPER SNACKS		
Objectives:		
Describe health of a healthy person.	79	78.2
Name different things that affect health.	82	81.2
Eat nutritious snacks.	100	99.0
Reasons objectives were not met:		
They were not suitable for the group.	1	1.0
They were too difficult for the group to achieve.	0	0.0
There was not enough time to achieve all objectives.	28	27.7
Teaching activities used:		
Select a meal from food models.	33	32.7
Play captain (from Bag of Tricks).	41	40.6
Have youth list snacks.	69	68.3

Table 41 (continued)

Lesson	Evaluations	
	N	%
Prepare a snack.	94	93.1
Play word scramble (What Is Health?)	59	58.4
2. MIGHTY MILK		
Objectives:		
Name two nutrients in milk and a reason they need each.	97	96.0
Recognize products made from milk.	99	98.0
Remember the number of servings recommended from the milk group.	96	95.0
Reasons objectives were not met:		
They were not suitable for the group.	1	1.0
They were too difficult for the group to achieve.	1	1.0
There was not enough time to achieve all objectives.	8	7.9
Teaching activities used:		
A brief review of Lesson 1 (SUPER SNACKS).	94	93.1
Prepare food made from milk (pudding, soup, etc.).	68	67.3
Experiment—vinegar and milk.	44	43.6
Serve milk foods.	92	91.1
Experiment—evaporated milk and powdered milk.	28	27.7
Show pictures or film.	18	17.8
Visit a dairy farm.	1	1.0
Visit the dairy section of the grocery store.	4	4.0
3. VITAMIN C FOR YOU AND ME		
Objectives:		
Name some vitamin C foods.	98	97.0
Tell one reason why they need vitamin C.	97	96.0
Remember the number of servings recommended from this group.	92	91.1
Reasons objectives were not met:		
They were not suitable for the group.	1	1.0
They were too difficult for the group to meet.	0	0.0
There was not enough time to achieve all objectives.	9	8.9
Teaching activities used:		
Review briefly Lesson 2 (MIGHTY MILK).	95	94.1
Discuss fruit and vegetable group and number of servings needed in the food guide.	88	87.1
Play "I See Vitamin C Foods."	58	57.4
Each youth name fruits and vegetables containing vitamin C.	92	91.1
Prepare and serve raw fruits and vegetables.	86	85.1
Experiment—sprouting seeds.	4	4.0
Plant radishes.	0	0.0
Select vitamin C foods by playing grocery store.	15	14.9

Table 41 (continued)

Lesson	Evaluations	
	N	%
4. MEET THE MEAT GROUP		
Objectives: (Check *any* that apply)		
Name foods included in the meat group.	97	96.0
Name two nutrients in meat and a reason each is needed.	96	95.0
Tell whether foods in this group come from animals or plants.	81	80.2
Remember the number of servings recommended from the meat group.	91	90.1
Reasons objectives were not met:		
They were not suitable for the group.	2	2.0
They were too difficult for the group to achieve.	2	2.0
There was not enough time to achieve all objectives.	10	9.9
Teaching activities used:		
Briefly review Lesson 3 (VITAMIN C FOR YOU AND ME).	95	94.1
Play "What Food Am I?"	45	44.6
Use flip chart, "How Food Affects You."	64	63.4
Prepare hamburger patty cooked at correct temperature.	48	47.5
Play "Peope and Their Food."	18	17.8
Experiment—tenderness of cuts of meat.	15	14.9
Visit a farm to see how animals are grown.	0	0.0
Play grocery store.	9	8.9
5. BRING IN BREADS AND CEREALS		
Objectives:		
Name foods in the bread and cereal group.	96	95.0
Name two nutrients in foods of this group and a reason each is needed.	95	94.1
Look for "enriched" or name of wholegrain ingredient on labels of foods made from grains.	90	89.1
Remember the number of servings recommended for this group.	95	94.1
Reasons objectives were not met:		
They were not suitable for the group.	0	0.0
They were too difficult for the group to achieve.	2	2.0
There was not enough time to achieve all objectives.	8	7.9
Teaching activities used:		
Have youth grind wheat.	3	3.0
Work food group puzzle (from Bag of Tricks).	54	53.5
Play "Tell About Food."	46	45.5
Name grains and goods made from them.	79	78.2
Explain enrichment and show labels of cereals that have been enriched.	89	88.1
Prepare foods suggested in the Fun Sheet.	53	52.5
Experiment—leavening agents.	3	3.0
Paste pictures of fruits, vegetables, and grains on the map.	12	11.9
Visit the bread and cereal sections of the grocery store.	4	4.0

Table 41 (continued)

Lesson	Evaluations	
	N	%
6. EAT YOUR WAY TO VITAMIN A		
Objectives: (Check *any* that apply.)		
Name some vitamin A foods.	95	94.1
Tell one reason why they need vitamin A.	95	94.1
Show how much fruit or vegetable counts as one serving.	91	90.1
Reasons objectives were not met.		
They were not suitable for the group.	0	0.0
They were too difficult for the group to achieve.	0	0.0
There was not enough time to achieve all objectives.	6	5.9
Teaching methods used:		
Review all previous lessons.	91	90.1
Play "ZIP ZIP ZAP".	19	18.8
Use display cards for vitamin A foods.	68	67.3
Sing the song on front of Fun Sheet.	83	82.2
Show a serving from the fruit and vegetable group.	81	80.2
Prepare vegetables showing how to conserve nutrients.	28	27.7
Plan a tasting party.	41	40.6
Make pictures of parts of the body (refer to Leader's Guide).	4	4.0
Taste foods preserved in various ways—canned, frozen, dried, etc.	13	12.9
Visit a grocery store—choose fruits and vegetables as nutritious snacks.	0	0.0

PART III: LIST OF REFERENCES AND GLOSSARY

A. *List of References*

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B. *Glossary*

Certain important terminology is employed throughout the context of this research report. Definitions of terms for use by analytical readers are grouped in alphabetical order under three categories to describe: (1) dietary adequacy, (2) nutrition education, and (3) personnel and clientele who participated in the research project.

Dietary Adequacy

Adequate diet: the number of servings to be included from Basic 4 Food Groups to meet a child's daily nutrition needs. (See Basic 4.)

Basic 4 Food Groups (Basic 4, Daily Food Guide): a food selection guide for choosing a nutritionally adequate diet from the four food groups. The recommended number of servings per day for the child (ages 8 through 12) include: 3 glasses of milk, 2 servings of protein foods (meat, eggs, dried beans), 4 servings of fruits and vegetables (one with vitamin C every day and one with vitamin A every other day), and 4 servings of whole grain or enriched cereals and bread.

Food consumption (food intake): all orally ingested foods, beverages, and materials that provide nutrients or calories, i.e., vitamin and mineral pills, sugar in chewing gum, and medicines with a sugar or alcohol base.

Recommended Dietary Allowances (RDA): the level of essential nutrients recommended by the Food and Nutrition Board of the National Research Council. The RDA for the child provide for body maintenance plus normal growth and development.

Nutrition Education

EFNEP: Abbreviation for Expanded Food and Nutrition Education Program.

Nutrition behavior: according to "Position Paper" (1973, p. 429), is "eating behavior [that] is psychologically motivated but . . . culturally and biologically determined"; behavior that is based on nutrition knowledge (cognitive behavior), attitudes and practices (affective behavior), and food intake (application of nutrition knowledge and attitude). Assessment of nutrition behavior change in this study was determined by changes in nutrition knowledge, attitude, and food intake of participating youth who were taught the Lesson Series.

Nutrition education: as defined by "Position Paper" (1973, p. 429), is:

> The process by which beliefs, attitudes, environmental influences, and understandings about food lead to practices that are scientifically sound, practical, and consistent with individual needs and available food resources. . . . Focus[es] on establishment and protection of nutritional health rather than crisis intervention. . . . Is needed, regardless of income, location, or cultural, social, or economic practices or level of education. . . . Must be a continuing process through the life cycle as new research brings additional knowledge.

Nutrition education program: a sequence of nutrition learning activities integrated into an individual's total environment, whether provided in school or in an informal setting, throughout life. The Lesson Series was developed as an integrated and properly sequenced series of lessons to meet the needs of disadvantaged youth, ages 8 through 12, for a nutrition education program.

Nutrition education change (learning): desirable outcomes or results of nutrition education that should enable the child to (Position Paper on Child Nutrition, 1974, pp. 520-521):

1. Increase his ability to make wise food choices throughout life.
2. Understand the relationship between food and health.
3. Gain knowledge of nutrients and their roles in the body.
4. Develop the ability to evaluate advertising and other claims made about food and nutrition.
5. Understand the influence of emotional and cultural factors on food choices.
6. Become aware of the role food can play in aiding him to reach goals he sets for himself.

Planned nutrition behavior change (learning): a deliberate effort to improve nutrition for Expanded Food and Nutrition Education Program (EFNEP) youth through intervention by a change-agent utilizing the Lesson Series.

Stages in planned nutrition behavior change (Position Paper, 1973, p. 429):

1. Awareness—helping the individual, family, or group identify problems related to the food consumed.
2. Development of a receptive framework for learning—
   a. Establishing the credibility of the nutrition educator.
   b. Being aware of learner's prior perceptions about food and nutrition.
   c. Helping to state desirable changes in food practices and to decide which are feasible.
3. Experimentation—testing ideas, techniques, and programs until acceptable ones are identified.
4. Reinforcement—strengthening the learning gained during the experimentation period.

3. Experimentation—testing ideas, techniques, and programs until acceptable ones are identified.
4. Reinforcement—strengthening the learning gained during the experimentation period.
5. Adoption of change—guiding the decision to accept the change and put it into practice.

Personnel and Clientele

EFNEP (Expanded Food and Nutrition Education Program) youth: youth (ages 8 through 12) from low-income families and various ethnic backgrounds who are enrolled in the EFNEP. Their families may or may not be enrolled in the adult phase of the program.

Low-income audience: marginal families existing on little money and in poor living conditions. Within this audience, the main target population is the family with children. These families include those with one or both parents (Guide for EFNEP, 1974, p. 5).

Professional: an individual employed by the Cooperative Extension Service with primary responsibility for the conduct of Extension programs. Generally a college/university graduate or equivalent.

Program aide (paraprofessional aide): an individual who, as an employee of the Cooperative Extension Service, receives direction from professionals and is employed to assist and/or extend the efforts of Extension program professionals through supervision and/or direct contact with clientele in the conduct of educational programs, projects, activities, etc.

"Teacher": a person (youth or adult) who teaches the Nutrition Lesson Series to youth. This person may be a volunteer, an aide, or a classroom teacher.

Volunteer: a person (youth or adult) who assists with adult and/or 4-H Youth in the EFNEP and who is not paid from federal Smith-Lever funds.

APPENDIX A

RESEARCH QUESTIONNAIRES

YOUTH'S BOOKLET

for

EXPANDED FOOD AND NUTRITION EDUCATION PROGRAM

EVALUATION STUDY

(This instrument was used for both pretest and posttest. The PERSONAL DATA ON YOUTH'S FAMILY was omitted in the posttest instrument.)

Name_____ I.D. number_____

Group I.D. number_____

CHECKLIST FOR PRETEST

Completed

_____ INFORMATION SHEET: YOUTH'S FORM

_____ INFORMATION SHEET: ADMINISTRATOR'S FORM

_____ NUTRITION KNOWLEDGE

_____ NUTRITION ATTITUDES AND PRACTICES

_____ YOUTH'S FOOD INTAKE RECORD

_____ PERSONAL DATA ON YOUTH'S FAMILY

NOTE: This checklist is included for the "teacher's" convenience. If each section is checked as completed by the youth, it will be possible to show that all forms in this booklet have been completed by the individual youth and his/her "teacher."

INFORMATION SHEETS ABOUT YOUTH AND ADMINISTRATOR

Youth's Form

Administrator's Form

7

Directions: To be filled in by the person who administers the questionnaires to the youth

INFORMATION SHEET: YOUTH'S FORM

(To be filled in by person administering questionnaire)

Do not write in this space:

I.D._____

1. Name_____

2. Age (at last birthday): (Check "X" one.)

1___ 8 years old
2___ 9 years old
3___10 years old
4___11 years old
5___12 years old

3. Grade in school: (Check "X" one.)

1___Second (2nd) grade
2___Third (3rd) grade
3___Fourth (4th) grade
4___Fifth (5th) grade
5___Sixth (6th) grade

4. 1___Boy (Check "X" one.)
2___Girl

5. Length of time in this Youth Group:

1___First meeting
2___1 to 3 months
3___3 1/2 to 6 months
4___6 months to one year
5___Over one year

INFORMATION SHEET: ADMINISTRATOR'S FORM
(To be filled in by person
administering questionnaire)

1. Administered in: (Check "X" one.)

   1___Minnesota
   2___Oklahoma
   3___North Carolina
   4___Vermont

2. Position or role of person administering questionnaire in this study: (Check "X" one.)

   1___Home economist
   2___Aide
   3___Volunteer
   4___Classroom teacher

3. Administered by:_____ I.D._____

4.	Do not write in this space: Identification number for administrator_____

5. Administered in: (Check "X" one.)

   1___Extension youth group
   2___School setting
   3___Other (specify)_____

6. City or community_____

7. Check ("X") one.

   1___Rural
   2___Nonfarm rural
   3___Urban

8. Date administered_____
   Month Day Year

PRETEST: NUTRITION KNOWLEDGE

This questionnaire should be used only with 8 through 12-year-old youth who have been selected to participate in the Study.

Procedures for administering:

1. The youth's name and identification number should be put on the front of the Pretest Booklet by the administrator of the questionnaire prior to administering the questionnaires. The I.D. numbers will be assigned by the Home Economist in charge of the Study. The assistance of a volunteer to fill in this information may be requested, if needed.

2. The administrator of the pretest or a volunteer assists the youth to fill in the Information Sheet for Youth.

3. The administrator of the Pretest should fill in the Information Sheet for the Administrator.

4. Each question should be read aloud to each youth group. Many have difficulty in reading or recognizing the words about foods and nutrition, so this is important. The statement of the question may be repeated several times to be sure that it is understood and heard by everyone. The captions under the pictures do not need to be read if the youth are able to recognize them. If they ask what a picture is, tell them so they will know. Leave ample time for them to answer, but not so they dawdle. They are not expected to know all the answers.

5. Allow the youth time to make the decision as to which answer is best. They are to put an "X" in the box for their choice of answer. There is only one best answer per question.

   Example: Question 6 should be read to them: "Put an "X" in the box which shows all the family members who need milk." You may try this question with your group to be sure that they understand the directions--it is a Trial Question. (All other questions are to be answered independently by the youth.) The answers given for Question 6 are: 1. Baby; 2. Boy and Girl; 3. Mother and Father; 4. Whole Family. Actually, any one of these answers is partially correct, because they are all true. The one best answer is "4. Whole Family."

   The questions may require the youth to organize the nutrition principles differently. It is important to use the behavioral objectives and content from the Lesson Series, not to teach the answers to a questionnaire. (Behavioral objectives are included in this Appendix.)

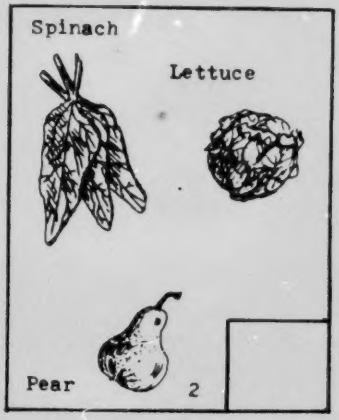
6. After completion of PRETEST: NUTRITION KNOWLEDGE, all booklets should be collected by the "teacher." The PRETEST: NUTRITION ATTITUDES AND PRACTICES section will be filled in at the next meeting of the group.

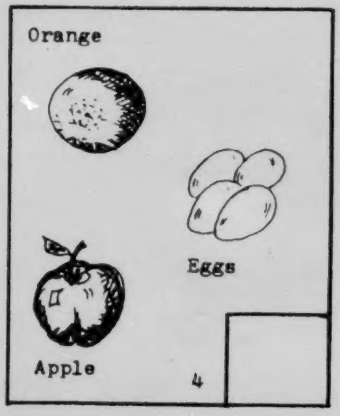
PRETEST: NUTRITION KNOWLEDGE QUESTIONNAIRE

FOOD, NUTRITION, AND YOU

6. Put an "X" in the box that shows all the family members who need milk.

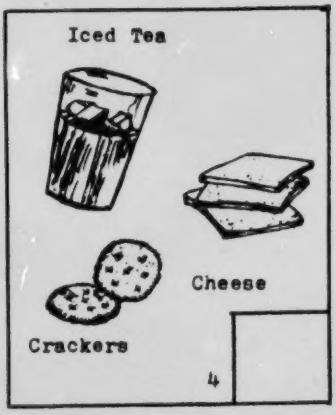
7. Put an "X" in the box that shows foods that are the main sources of calories or energy for the body.



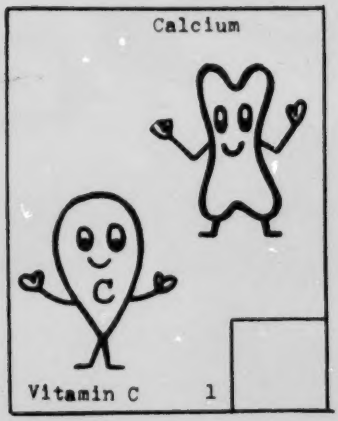


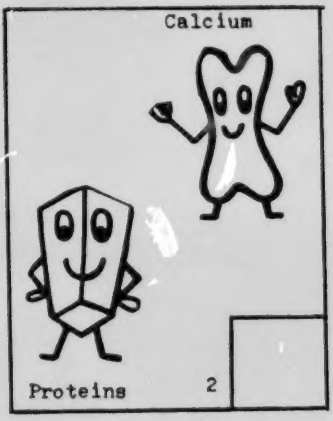
8. Put an "X" in the box that shows a healthy child.

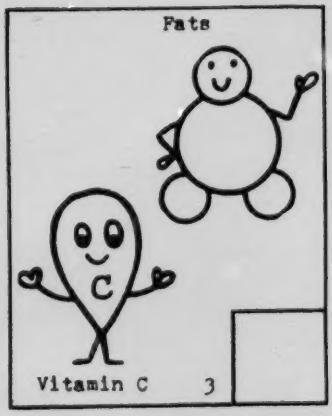
9. Put an "X" in the box with only super snacks that add to the food groups.

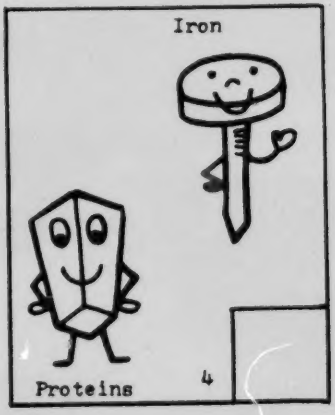


10. Put an "X" in the box that has the main nutrients found in milk.

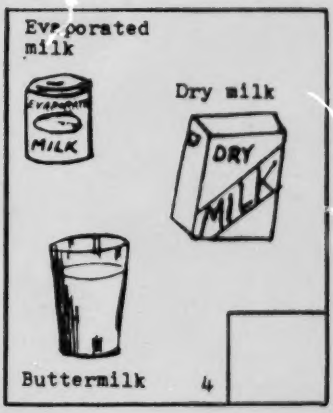




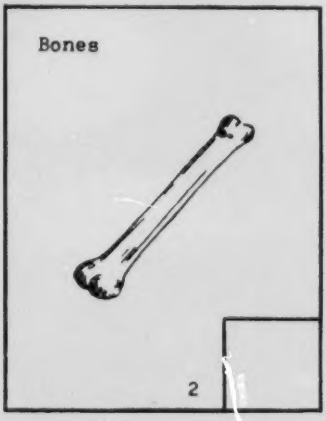




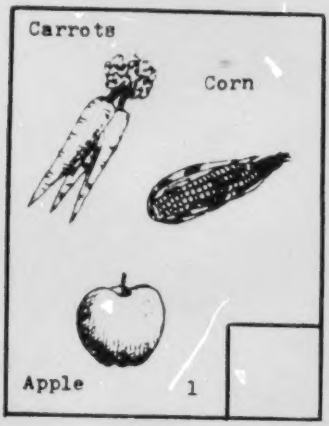
11. Put an "X" in the box that shows foods rich in calcium.

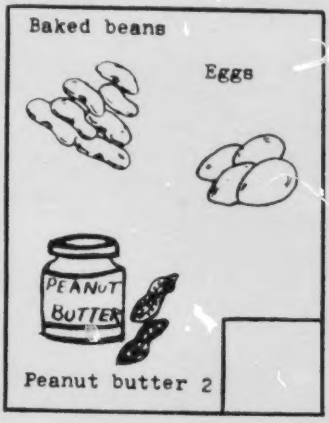


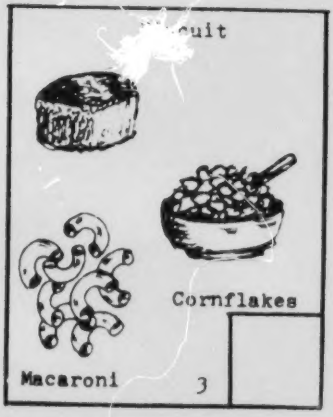
12. Put an "X" in the box that shows the part of your body that needs the most calcium.



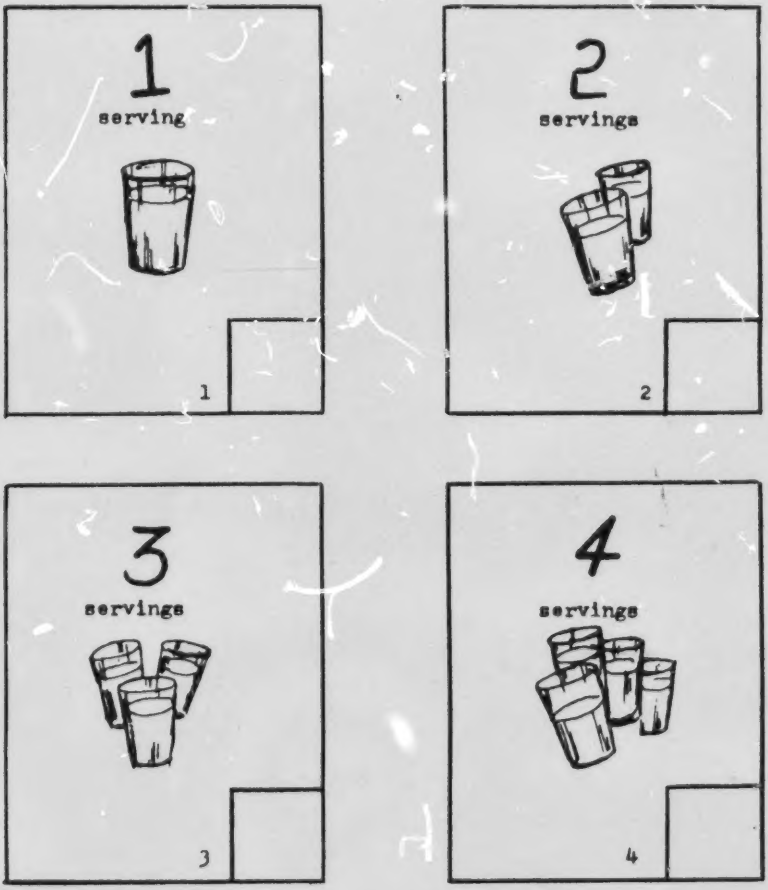
13. Put an "X" in the box that shows foods that could be used to replace the milk you drank with meals. (They provide the <u>two</u> main nutrients in milk.)



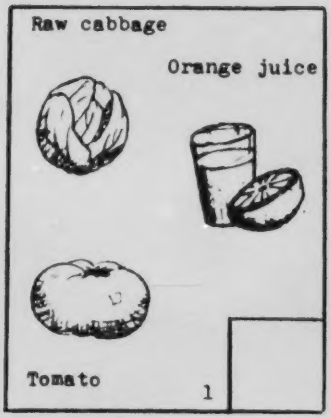


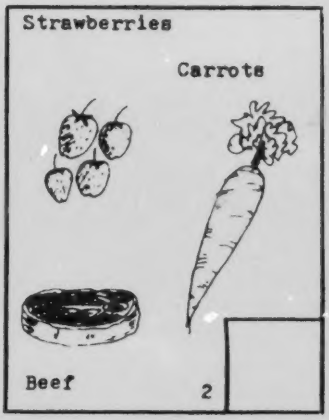


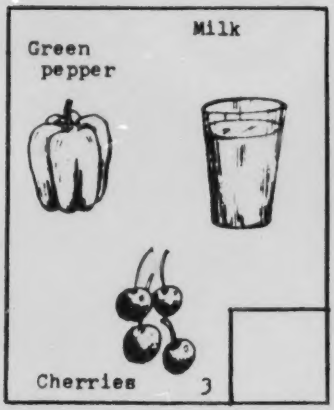
14. Put an "X" in the box that shows the number of servings from the milk group that you need each day.



15. Put an "X" in the box that shows only foods rich in vitamin C.







16. Put an "X" in the box that shows what vitamin C does in your body.

Helps get energy from food.

1 ☐

Repairs tissue and keeps your mouth and gums healthy.

2 ☐

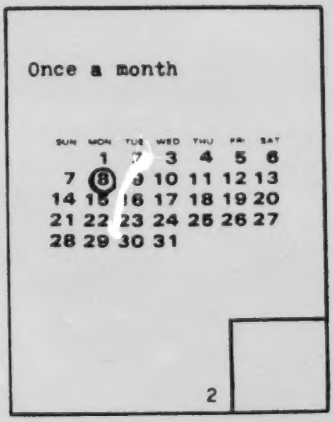
Helps blood carry oxygen.

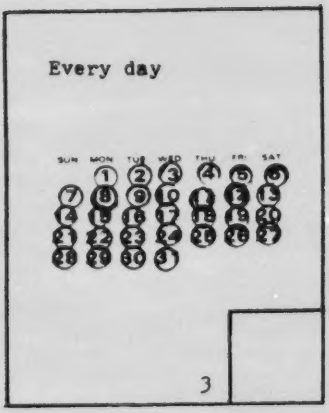
3 ☐

Helps build muscles in your body.

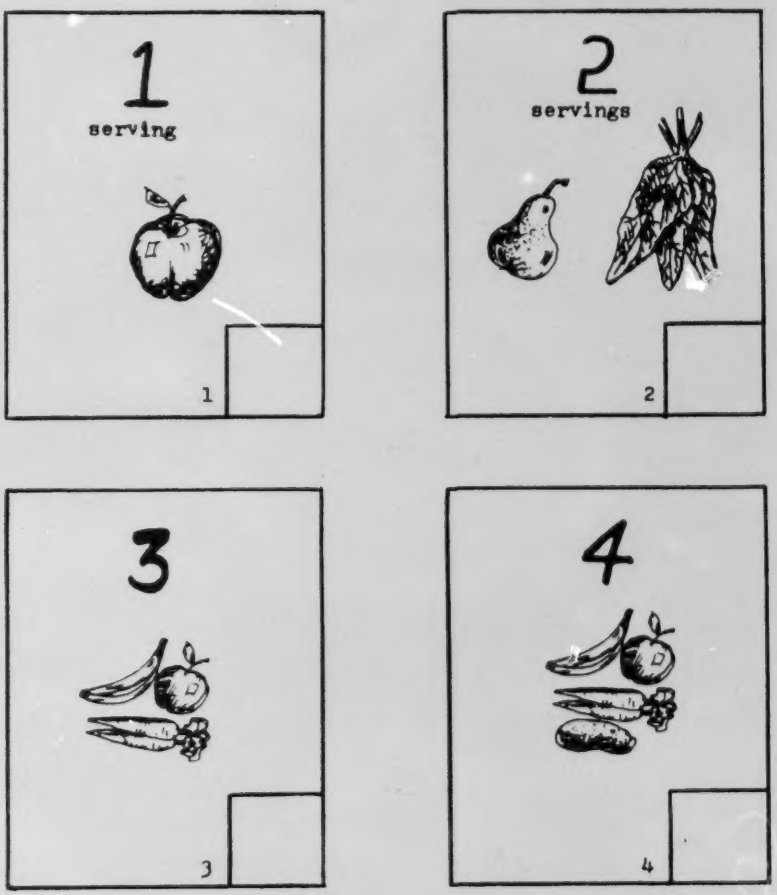
4 ☐

17. Put an "X" in the box that shows when you need vitamin C.

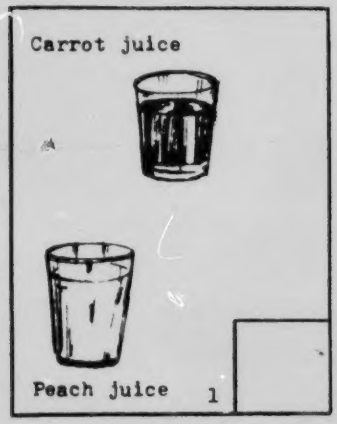


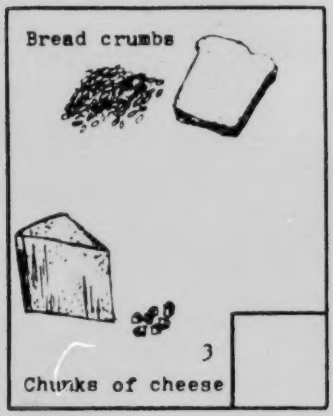


18. Put an "X" in the box that shows the number of servings of fruits and vegetables you need each day.

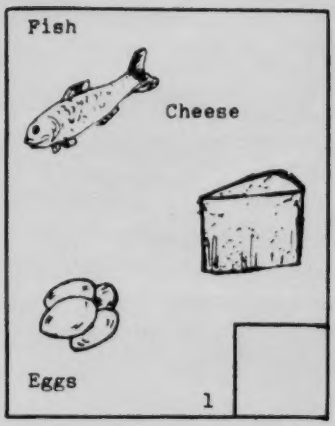


19. Put an "X" in the box that shows foods you could put over apples, bananas, and pear slices to keep them from turning dark.





20. Put an "X" in the box that shows good sources of protein.



21. Put an "X" in the box that shows foods that could be used in place of meat.

Gelatin Dessert (Jello)

Cream

Graham crackers 1

Dry beans, peas and lentils

Cottage cheese

Nuts 2

Cookies

Cornbread and butter

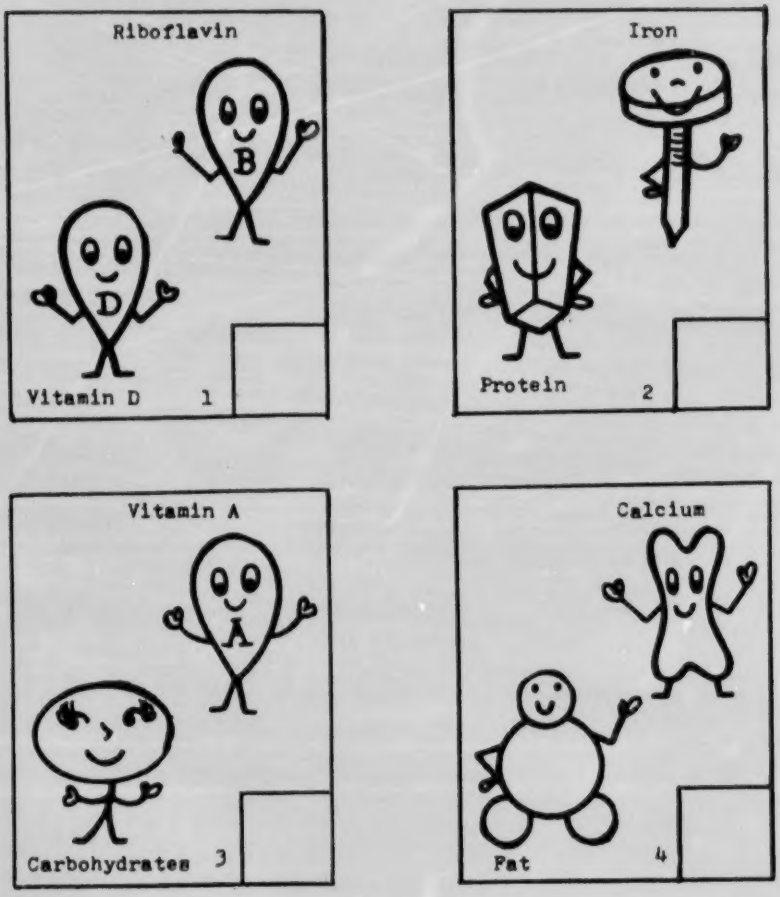
Chocolate milk shake 3

Corn

Canteloupe

Pumpkin Pie 4

22. Put an "X" in the box that shows the main nutrients found in meat.



23. Put an "X" in the box that shows the best answer as to why protein is needed by the body.

Proteins build muscles, bone, and hair

1

Proteins give energy

2

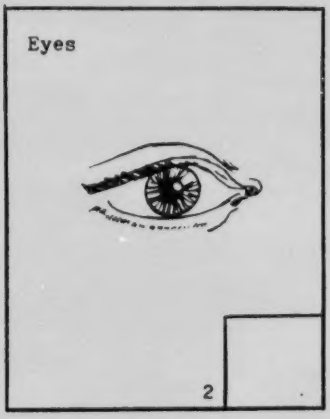
Proteins repair tissues

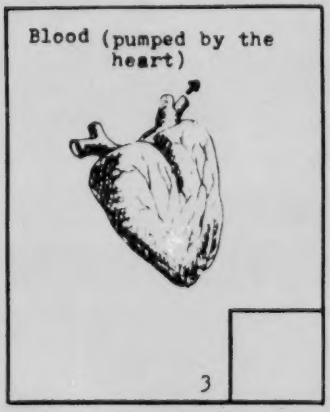
3

Proteins build and repair tissues, provide energy

4

24. Put an "X" in the box that shows part of the body where iron is needed.



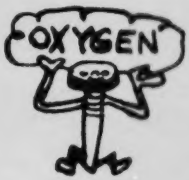


25. Put an "X" in the box that shows the reason iron is needed by the body.

To see in dim light

1

To help your blood carry oxygen



2

To build muscles, bones, and hair

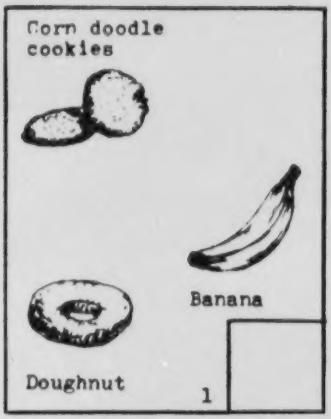
3

To repair tissue and keep your mouth and gums healthy

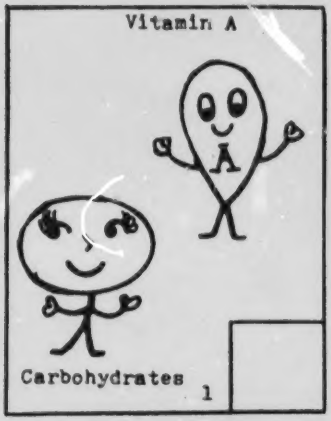
4

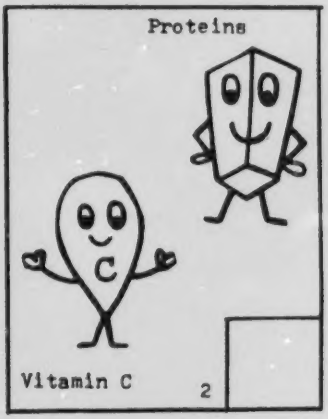
26. Put an "X" in the box that shows the number of servings needed from the meat group each day.

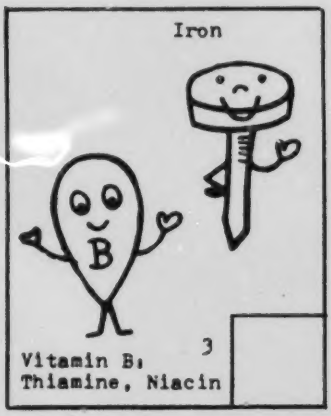
27. Put an "X" in the box that shows only foods found in the bread and cereal group.

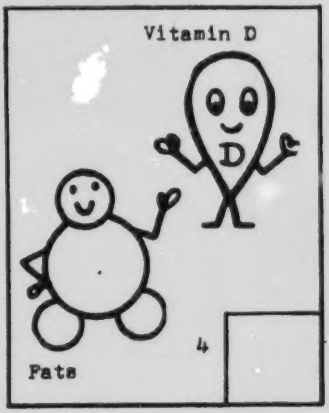


28. Put an "X" in the box that shows nutrients found in the bread and cereal food group.









29. Put an "X" in the box that shows the reason B vitamins are needed by the body.

To help heal cuts

1

To see in dim light

2

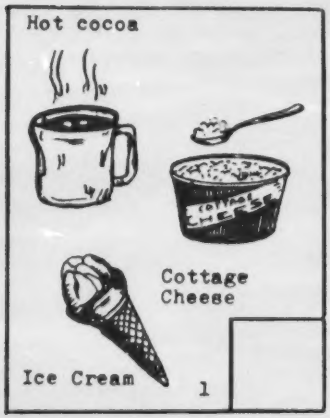
To grow long fingernails

3

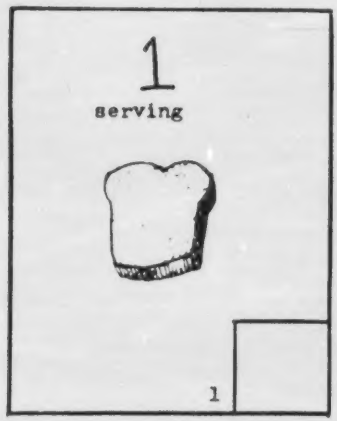
To help you have a good appetite

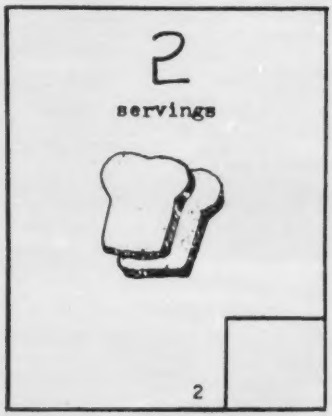
4

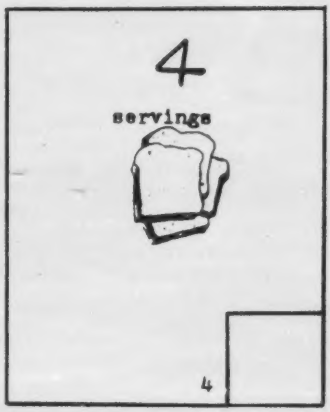
30. Put an "X" in the box that shows foods in the food group that should be enriched or whole grain.



31. Put an "X" in the box that shows the number of servings of br ad and cereal you should eat each day.







32. Put an "X" in the box that shows only foods rich in vitamin A.

33. Put an "X" in the box that shows the reason vitamin A is needed by the body.

To see in dim light

1

To help your blood carry oxygen

2

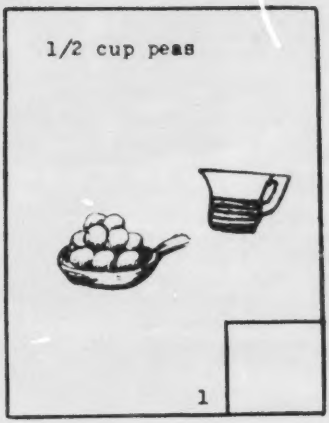
To build muscles, bones and hair

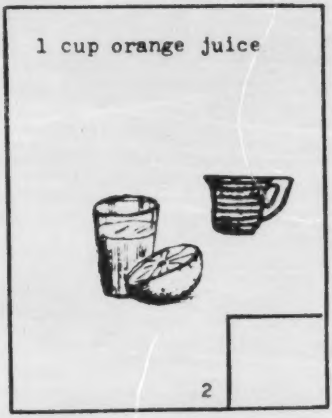
3

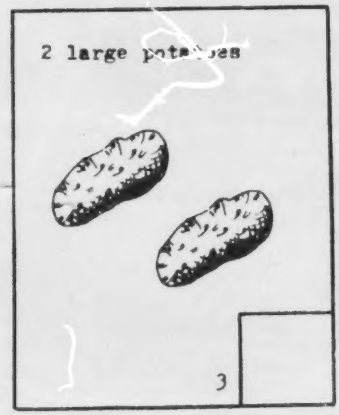
To repair tissue and keep your mouth and gums healthy

4

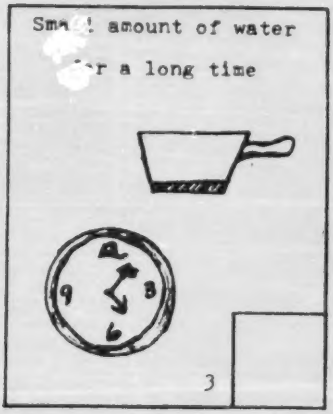
34. Put an "X" in the box that shows the usual size serving from the fruit and vegetable group.



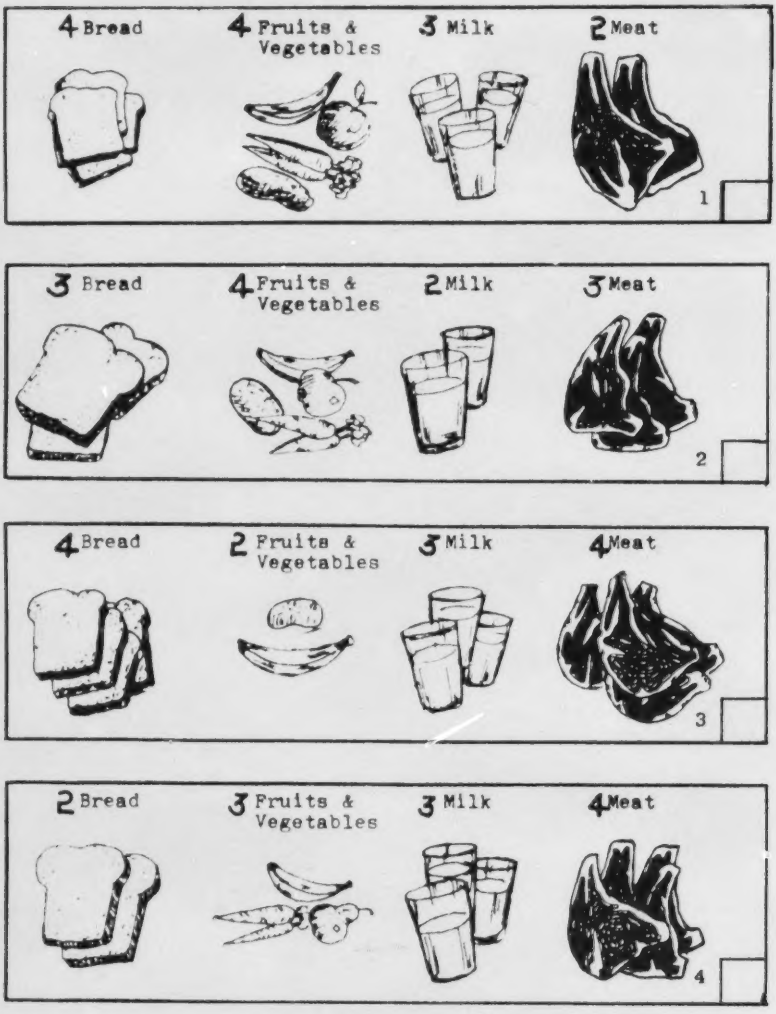




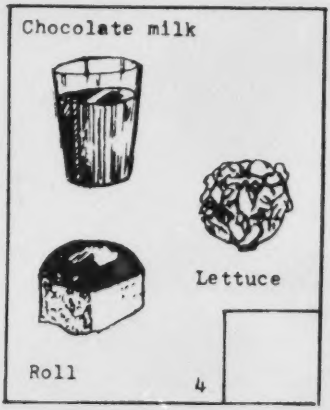
35. Put an "X" in the box that shows the way vegetables should be cooked.



36. Put an "X" in the box that shows the food grouping with the correct number of servings for your age. (The number of servings needed each day is in front of the food group.)



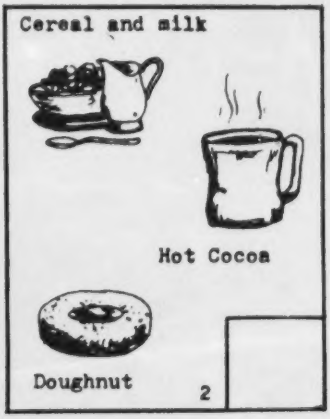
37. Put an "X" in the box that shows only foods rich in iron.

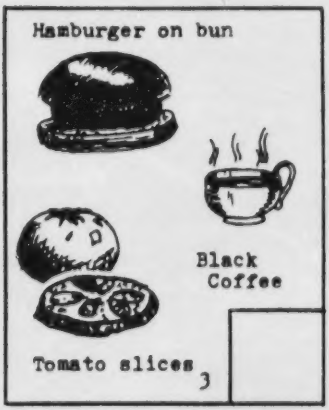


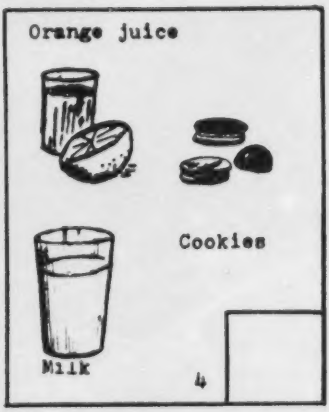
38. Put an "X" in the box that shows a food that has vitamin A and a food that has vitamin C in the same meal.

39. Put an "X" in the box that shows the most nutritious breakfast.

40. Put an "X" in the box that shows foods that could provide a nutritious meal or breakfast.







41. Put an "X" in the box that shows the most nutritious dinner.

PRETEST: NUTRITION ATTITUDES AND PRACTICES

Procedures for administering:

1. During the second meeting of the group, each youth's Pretest Booklet should be returned to him/her to fill in the Nutrition Attitudes and Practices section.

2. Each question and its directions should be read aloud to each Study Group. It should be repeated so the youth understand the question and the directions given.

   Each youngster needs to understand the directions for every question. Some questions require that they check one answer. Others ask them to check several answers or any that apply. Others ask that they check either YES or NO.

   The first question in this section requests that they check any (or all) of the places or people from which they have learned about nutrition. They may check none, one or more, or all of the answers as it applies.

3. The major portion of this section is related to the youngster's attitudes toward food, himself, his parents, his school, and his teacher. It is important that the youth checks "how he feels" about these items, not how his neighbor feels or how he thinks others expect him to feel. Each youth is an individual! How he feels and what he does about food should be his own.

4. Monitors should see that each youth is checking answers in the proper space and appropriate number for the directions. It is important to see that he is following on the correct line for the YES and NO answers.

5. When this section is completed by the youth, the booklets are to be returned to the person administering the questionnaire. (This person should be responsible for the collection of the information needed for the Food Intake Record and Personal Data on Youth's Family form for each booklet. Volunteers may assist with collecting this information between the first and second meetings.)

PRETEST: NUTRITION ATTITUDES AND PRACTICES

42. IN THE BLANK IN FRONT OF THE ANSWER, CHECK ("X") ALL THE ONES THAT TELL WHERE YOU HAVE LEARNED ABOUT FOODS.

1___4-H CLUB OR EFNEP YOUTH GROUP
2___MULLIGAN STEW
3___NUTRITION MATERIALS FROM EXTENSION WORKERS
4___OTHER YOUTH GROUPS
5___MY MOTHER
6___MY TEACHER
7___CLASSES IN SCHOOL
8___TELEVISION, BOOKS, RADIO

THIS IS THE WAY I FEEL:

PLEASE CHECK ("X") EITHER YES OR NO FOR THE FOLLOWING STATEMENTS.

	(1)	(2)	
43.	___YES	___NO	I STUDY MORE THAN MY TEACHER WANTS ME TO.
44.	___YES	___NO	I HAVE WON AWARDS OR PRIZES FOR MY SCHOOL WORK.
45.	___YES	___NO	MY SCHOOL WORK IS MORE IMPORTANT THAN PLAYING WITH MY FRIENDS.
46.	___YES	___NO	I'M PRETTY SURE OF MYSELF.
47.	___YES	___NO	IF I HAVE SOMETHING TO SAY, I USUALLY SAY IT.
48.	___YES	___NO	I LIKE TO SHARE MY TOYS WITH OTHERS.
49.	___YES	___NO	MY PARENTS UNDERSTAND ME.
50.	___YES	___NO	I LIKE TO BE BY MYSELF MOST OF THE TIME.
51.	___YES	___NO	MOST OF THE TIME I FEEL HAPPY.
52.	___YES	___NO	I LIKE TO BE WITH OTHER PEOPLE MOST OF THE TIME.
53.	___YES	___NO	CLUBS, TEAMS, AND OTHER GROUPS ARE IMPORTANT TO ME.
54.	___YES	___NO	MOST OF THE TIME I FEEL UNHAPPY.

55. ___YES ___NO I LIKE TO GO TO PARTIES.
56. ___YES ___NO I HAVE MANY FRIENDS.
57. ___YES ___NO I CHOOSE FRIENDS WHO ARE SMALLER THAN ME.
58. ___YES ___NO I CHOOSE FRIENDS WHO ARE ABOUT THE SAME SIZE AS ME.
59. ___YES ___NO I GIVE IN VERY EASILY.
60. ___YES ___NO I LIKE TO HELP OTHERS.
61. ___YES ___NO MY PARENTS EXPECT MORE OF ME THAN I CAN DO.
62. ___YES ___NO I OFTEN FEEL LIKE GIVING UP IN SCHOOL.
63. ___YES ___NO I DON'T DO THINGS RIGHT.
64. ___YES ___NO MOST THINGS I DO WELL.
65. ___YES ___NO THERE ARE LOTS OF THINGS ABOUT MYSELF THAT I WOULD CHANGE IF I COULD.
66. ___YES ___NO I GET UPSET EASILY AT HOME.
67. ___YES ___NO I'M OFTEN SORRY FOR THE THINGS I DO.
68. ___YES ___NO IT TAKES ME A LONG TIME TO GET USED TO ANYTHING NEW.
69. ___YES ___NO I LIKE MY TEACHER AT SCHOOL.
70. ___YES ___NO I LIKE MY SCHOOL.

71. I WANT TO: (CHECK "X" ONE.)

1___FINISH HIGH SCHOOL.
2___FINISH COLLEGE.
3___FINISH TRADE SCHOOL OR BUSINESS COLLEGE.
4___DON'T KNOW.

CHECK ("X") EITHER YES OR NO FOR THE FOLLOWING STATEMENTS:

(1) (2)
72. ___YES ___NO I USUALLY EAT THE MORNING MEAL.
73. ___YES ___NO I USUALLY EAT THE NOON MEAL.
74. ___YES ___NO I USUALLY EAT THE NIGHT MEAL.
75. ___YES ___NO I USUALLY EAT SNACKS IN ADDITION TO MEALS.
76. ___YES ___NO I USUALLY EAT SNACKS IN PLACE OF MEALS.
77. ___YES ___NO I LIKE TO EAT SNACKS.
78. ___YES ___NO I USUALLY TAKE A VITAMIN AND/OR MINERAL PILL EACH DAY.

CHECK ("X") ONLY ONE IF THIS STATEMENT APPLIES TO YOU:

79. I USUALLY EAT THE MORNING MEAL:

1___AT HOME.
2___AT SCHOOL IN THE BREAKFAST PROGRAM.
3___OTHER.

CHECK ("X") ONLY ONE IF THIS STATEMENT APPLIES TO YOU:

80. I USUALLY EAT THE MORNING MEAL:

1___ALONE.
2___WITH MY FAMILY.
3___WITH OTHERS.

CHECK ("X") ONLY ONE IF THIS STATEMENT APPLIES TO YOU:

81. I USUALLY EAT THE NOON MEAL:

1___AT HOME.
2___IN THE SCHOOL LUNCH PROGRAM.
3___BY BRINGING MY LUNCH FROM HOME.
4___VERY SELDOM, IF AT ALL.
5___BY SNACKING.
6___OTHER.

CHECK ("X") ONLY ONE IF THIS STATEMENT APPLIES TO YOU:

82. I USUALLY EAT THE NOON MEAL:

1___ALONE.
2___WITH MY FAMILY.
3___WITH OTHERS.

CHECK ("X") ONLY ONE IF THIS STATEMENT APPLIES TO YOU:

83. I USUALLY EAT THE NIGHT MEAL:

1___AT HOME.
2___BY SNACKING.
3___SELDOM, IF AT ALL.
4___OTHER.

CHECK ("X") ONLY ONE IF THIS STATEMENT APPLIES TO YOU:

84. I USUALLY EAT THE NIGHT MEAL:

1___ALONE.
2___WITH MY FAMILY.
3___OTHER.

85. CHECK ("X") IN THE FOLLOWING LIST ANY OF THE FOODS YOU LIKE TO EAT.

___BREAD
___CABBAGE
___CARROTS
___CHEESE
___DARK GREEN VEGETABLES
___GRAPEFRUIT
___HAMBURGER
___ICE CREAM
___LIVER
___PEANUT BUTTER
___SQUASH
___SWEET POTATOES
___TOMATOES
___TUNA

PRETEST: YOUTH'S FOOD INTAKE RECORD

Procedures for obtaining the Youth's Food Intake Record during the Study:

1. The list of all foods and beverages taken in by the youngster during the past 24-hour period should be recorded in the proper position on the form for each meal or snack.

2. Place the date for the day that the record is being recorded in the space provided.

3. If the youngster is 8 to 9 years old, he may need the assistance of an adult to help him remember the foods that he ate for each meal or snack. A 10 to 12-year-old may be able to provide his intake record without too much questioning about foods and drinks consumed.

4. The youngster should be asked what he ate for the meal or snack just prior to the recording of the Food Intake. Then the person taking the Food Intake Record should work backward for the entire 24-hour period. Example: If the interviewer is taking the record after lunch, ask the youth what he ate for lunch. Be sure to put down all items that the youth has taken by mouth, even vitamin pills if possible. Proceeding backward, the interviewer needs to check on a morning snack, then on breakfast, etc.

5. Regardless of the Study Group involved, it may be helpful if the interviewer knows the School Lunch Menu and the School Breakfast Menu for the day the Food Intake Record is taken.

PRETEST: YOUTH'S FOOD INTAKE RECORD

(To be filled in by administrator
and/or parent)

PRETEST: YOUTH'S FOOD INTAKE RECORD
(To be filled in by administrator and/or parent.)

Name_____

Date_____
Month Day Year

What foods did the child eat and drink in the last 24 hours? (List main food in mixed dishes.)	To be filled in by aide or agent: Milk	Meat	Veg/ fruit	Bread/ cereal
Morning				
Midmorning				
Noon				
Afternoon				
Evening				
Before bed				
Total number of servings				
Totals one or more servings of each of four food groups.	1	1	1	1
	1___YES 2___NO			
Totals 2 or more servings milk/meat; 4 or more veg/ fruit and bread/cereals.	3	2	4	4
	1___YES 2___NO			

Vitamin C (1___YES 2___NO)

Vitamin A (1___YES 2___NO)

Procedures to follow to complete the Personal Data on Youth's Family form:

1. The personal data about the youth's families requested on this form are needed for the Evaluation Study. The information is confidential and individual families will not be identified by the Study.

2. Wherever possible, get the information from records already available. Some information about EFNEP families may be obtained from the Family Record Form. If school policy permits, some of the information may be obtained from school records. Data not available from these sources will need to be gotten from the parents or family by volunteers or aides. Classroom teachers may select other methods to obtain these data. Remember the Youth Booklet is to be kept under the direct jurisdiction of the "teacher" (aide, volunteer, or classroom teacher) of the group at all times until returned to the Extension Home Economist in charge of the Study. It is not to be sent home with the youth.

3. If more than one youth in a family is in the Study, this form should be completed in only one Youth Pretest Booklet. In the booklets of other family members, the questionnaire should be answered through Question 86:

   Filled in by_____

   I.D. number_____

   Then, in the box that states: "Fill in this form only once ...., indicate on the lines provided the I.D. numbers of other family youth involved in this Study. All I.D. numbers should be included here.

   In the booklets with partially completed forms, please make the notation that the complete family information is in the Pretest Youth Booklet of the youth named _____ and give his I.D. number. Example:

   John, Joe, and Sally Smith are in a group. The Personal Data on Youth's Family form is completed in John's booklet, and gives the information about Joe and Sally. In the booklets for Joe and for Sally, this Personal Data on Youth's Family form should have the top section filled in and should show that the family's data are in John Smith's booklet, his I.D. number being _____.

   If more than three youngsters per family are in a group, additional forms for these data may be provided. Such additional forms should be stapled to the inside back cover of the youth's Pretest Booklet that has the information about the other three youngsters.

PERSONAL DATA ON YOUTH'S FAMILY
(To be filled in by person administering questionnaire)

Name_____

Group I.D. number_____

86. Filled in by_____
I.D. number _____

Fill in this form only once per family and indicate here the I.D. numbers of other family youth involved in this study_____
_____

87. Name of parent or guardian_____

Do not write in this space.
Family's I.D. number_____

88. Address_____
_____
City State

89. Location: (Check "X" one.)

1___Rural 2___Rural nonfarm 3___Urban

90. Children in this family who are participating in the Study:

1. Child's name_____I.D._____

(1) (2)
a. ___YES ___NO Participates in School Breakfast Program.
b. ___YES ___NO Participates in School Lunch Program.
c. ___Boy ___Girl
d. Age:
1___8 years old 4___11 years old
2___9 years old 5___12 years old
3___10 years old

e. Grade in school:

1___2nd grade
2___3rd grade
3___4th grade
4___5th grade
5___6th grade

2. Child's name_____I.D._____

(1) (2)

a. ___YES ___NO Participates in School Breakfast Program.

b. ___YES ___NO Participates in School Lunch Program.

c. ___Boy ___Girl

d. Age:

1___8 years old
2___9 years old
3___10 years old
4___11 years old
5___12 years old

e. Grade in school:

1___2nd grade
2___3rd grade
3___4th grade
4___5th grade
5___6th grade

3. Child's name_____I.D._____

(1) (2)

a. ___YES ___NO Participates in School Breakfast Program.

b. ___YES ___NO Participates in School Lunch Program.

c. ___Boy ___Girl

d. Age:

1___8 years old
2___9 years old
3___10 years old
4___11 years old
5___12 years old

e. Grade in school:

1___2nd grade
2___3rd grade
3___4th grade
4___5th grade
5___6th grade

91. Total number of children in family_____

92. Total number of children living at home_____

93. Head-of-household present: (Check "X" YES or NO for each.)

(1) (2)

___YES ___NO Male (or husband)
___YES ___NO Female (or wife)
___YES ___NO Guardian

94. Total number living in household_____

95. Age of homemaker: (Check "X" one.)

1___18 years or less
2___19 to 25 years
3___25 to 35 years
4___36 to 45 years
5___46 years or more

96. Number of years of school completed by the head-of-household: (Check "X" the one best answer.)

1___8th grade or less
2___1-3 years in high school
3___High school graduate
4___1-3 years in college, business school, or trade school
5___4 or more years in college (college graduate)

97. Occupation of the head-of-household is:_____

98. Participation in EFNEP: (Check "X" one.)

1___EFNEP Program family
2___Non-EFNEP Program family

99. About how much money did your family have to spend last month? Please include income from all sources. (Check "X: one.)

1___Under $84
2___$84 to $167
3___$168 to $250
4___$251 to $333
5___$334 to $417
6___$418 and over

100. Check ("X") for the homemaker:

1___White
2___Black
3___Spanish surname
4___American Indian
5___Oriental
6___Other

101. In which of the following activities does the homemaker participate? (Check "X" any that apply.)

1___Church. Specify activities:_____
2___Civic or community clubs. Name:_____
3___Homemaker's Club
4___Other. Name:_____

Check either YES or NO for the following:

	(1)	(2)	
102.	___YES	___NO	Does your family have a garden during the growing season?
103.	___YES	___NO	Does your family raise animals for meat to eat?
104.	___YES	___NO	Does your family raise fowl (chickens, ducks, and/or geese) to eat?
105.	___YES	___NO	Does your family raise chickens for the eggs?
106.	___YES	___NO	Does your family freeze food for future use?
107.	___YES	___NO	Does your family can or preserve food for future use?
108.	___YES	___NO	Does your family dry food for future use?

109. Check ("X") any of the following items that are in the home and in working order:

1___Black and white TV
2___Color TV
3___Both of the two above or more than one set

1___Electric range
2___Gas range
3___Hot plate to cook meals
4___Kerosene range
5___Wood stove

1___Automatic clothes washer
2___Electric clothes dryer

1___Refrigerator
2___Separate freezer
3___Both of the two above

1___Electric food mixer
2___Electric lights
3___Hot water heater
4___Running water in the kitchen

NOTE: If more than three children from the family are in this group, the information on the additional ones can be jotted down here and coded on card 2.

152 PERSONAL DATA QUESTIONNAIRE, DESCRIPTION OF TRAINING FOR THE STUDY, AND HOME ECONOMIST'S QUESTIONNAIRE

Procedures to follow to complete the Personal Data Questionnaire, the Description of Training for the Study questionnaire, and the Home Economist's Questionnaire:

This section includes the following questionnaires:

1. Personal Data Questionnaire. This form is to be filled in by all volunteers, aides, classroom teachers, and Extension Home Economists who are participating in the EFNEP Evaluation Study.

2. Description of Training for the Study. This form is to be filled in by all volunteers, aides, and classroom teachers who are participating in the EFNEP Evaluation Study.

3. Home Economist's Questionnaire. This form is to be filled in by the Extension Home Economist in charge of the Study.

Please supply all the information requested on the questionnaires. All information collected is confidential and will not be used to identify individuals at any point within this Study.

These questionnaires are to be completed as a part of the training session(s). If training session(s) extend beyond February 1, 1975, the Description of Training for the Study form should be completed at that time on the sessions already held. The date for these three completed forms to be returned to the Home Economist in charge of the Study is February 1, 1975.

Special directions for the Personal Data Questionnaire:

Question 9 on page 2 of this questionnaire asks: "What is the occupation of the head of your household?" A line is provided for your answer.

a. In many cases, the man and woman may both be working to maintain the house hold. In this instance, please write: (1) male (or husband) and his occupation -- then -- (2) female (or wife) and her occupation.

b. If the woman is the head of the household, please write: (1) female and her occupation.

c. If it is not indicated that a male and/or female are the head of the household, it will be assumed that the head-of-household is a male.

In the case of youth volunteers (18 years or less), the information on the Personal Data Questionnaire pertaining to household or family information will be about the parents' household and the youth volunteer's own family.

County_____State_____

PERSONAL DATA QUESTIONNAIRE

(To be filled in by all volunteers, aides, home economists, and classroom teachers participating in the EFNEP Evaluation Study.)

1. Name_____I.D._____

2. Date_____

3. What is your role as a participant in this Study? (Check "X" one.)

1___Home economist
2___Aide
3___Volunteer
4___Classroom teacher
5___Other (specify)_____

4. Group I.D._____

5. What is your age? (Check "X" one.)

1___Under 18 years of age
2___19 through 25 years
3___26 through 35 years
4___36 through 45 years
5___46 years or more

6. What is your sex? (Check "X" one.)

1___Male
2___Female

7. What is the highest grade in school or level of education that you have completed? (Check "X" one.)

1___8th grade or less
2___1-3 years of high school
3___High school graduate
4___1-3 years of college, business, or trade school
5___College graduate
6___Graduate work beyond the bachelor's degree
7___Master's degree in _____
(Write in subject-matter area)
8___Other (explain briefly)_____

8. What is your ethnic background? (We would appreciate this information for the Study only.) (Check "X" one.)

1___White
2___Black
3___Spanish surname
4___American Indian
5___Oriental
6___Other

9. What is the occupation of the head of your household?

_____

10. Check ("X") the category that best describes your family's total annual income.

1___Less than $1000
2___$1000 to 2999
3___$3000 to 4999
4___$5000 to 6999
5___$7000 to 9999
6___$10,000 to 11,999
7___$12,000 to 14,999
8___$15,000 and over

11. In what community activities do you participate? (Check "X" all that apply.)

1___Church
2___Civic clubs
3___Homemaker's Club
4___Professional organizations

12. How long have you been in the present position as a classroom teacher, or an aide, or a home economist, or a volunteer? (Check "X" one.)

1___Less than 1 year
2___1 year
3___2 to 3 years
4___Over 4 years

13. How long have you been working with the Expanded Food and Nutrition Education Program (EFNEP)? (The classroom teachers and the classroom volunteers may omit this question.)

1___Less than 1 year
2___1 year
3___2 to 3 years
4___Over 4 years

14. In what other work experience(s) or volunteer activities have you participated? (Check "X" any that apply.)

1___Youth group leader for such groups as Scouts, YMCA/YWCA youth, or church groups.
2___School or commercial food service work.
3___Food and nutrition teaching in schools or for community groups.
4___School teaching.
5___No other work or experience as a volunteer

TO BE ANSWERED BY AIDES AND VOLUNTEERS ONLY

15. Does your family receive any of the following? (Check "X" all that apply.)

1___USDA Food Stamps
2___USDA/FHA (Federal Housing Administration) assistance
3___Social Service (Welfare)

TO BE ANSWERED BY YOUTH VOLUNTEERS ONLY

Check ("X") either YES or NO for each of the following statements, except question 17, for which record a number.

(1) (2)

16. ___YES ___NO Are you presently a member of 4-H?

17. If yes, how many years have you been a member? ___years

18. ___YES ___NO If you are not presently a member of a 4-H Club, have you ever been a member?

19. ___YES ___NO Is your family a member of the Expanded Food and Nutrition Education Program?

DESCRIPTION OF TRAINING FOR THE STUDY

(To be filled in by all volunteers, aides, and classroom teachers participating in the Expanded Food and Nutrition Education Program Evaluation Study.)

20. How many training sessions did you attend? (Check "X" only one.)

1___1 session
2___2 to 3 sessions
3___4 to 5 sessions
4___6 or more sessions

21. How long did each session usually last? (Check "X" only one.)

1___Less than 1 hour
2___Between 1 to 2 hours
3___Between 2 to 3 hours
4___Between 3 to 4 hours
5___Over 4 hours

22. Over what period of time were the training sessions held? (Check "X" only one.)

1___Less than 1 full day or less than 5 to 6 hours
2___Between 1 to 3 days
3___Between 4 to 5 days
4___Between 6 to 9 days
5___Between 10 to 14 days
6___Other. Explain briefly_____

23. Where were the training sessions held? (Check "X" only one.)

1___The county Extension office
2___A community center
3___A church
4___A school
5___A home
6___Other. Explain briefly_____

24. Based upon the training received, what do you consider as your responsibility (or responsibilities) in the EFNEP Evaluation Study? (Check "X" any that apply.)

1___To organize youth groups.
2___To provide a place for the youth group to meet.
3___To assist with teaching the Lesson Series.
4___To teach the Lesson Series.
5___To keep the records regarding the study.
6___To assist the teacher or leader of the group.

25. What would make the training sessions more helpful to you as a participant in the Study? (Check "X" any that apply.)

1___Different learning activities.
2___More active personal involvement in the activities.
3___Different methods of teaching being utilized.
4___More details on the methods for conducting the Study.
5___Other. Explain briefly_____

26. What training and/or assistance did you receive from the Home Economist to help you participate in this Study?

1___Individual instruction on how to conduct the Study.
2___Group training session(s) on how to conduct the Study.
3___Individual instruction on the Nutrition Lesson Series and activities suggested.
4___Group training session(s) on the Nutrition Lesson Series and activities suggested.

HOME ECONOMIST'S QUESTIONNAIRE

(To be filled in by Extension Home Economists participating in the EFNEP Evaluation Study.)

27. Home economist_____I.D._____

28. Which of the following methods did you use in the training session(s)? (Check "X" any that apply.)

1___Demonstration
2___Display
3___Discussion
4___Field trip
5___Group activity
6___Lecture
7___Lesson read to trainees
8___Role play
9___Scientific experiment

29. If you were to do the training session(s) again, which methods would you use? Indicate only those methods that are different from those which you did use. (Check "X" any that apply.)

1___Demonstration
2___Display
3___Discussion
4___Field trip
5___Group activity
6___Lecture
7___Lesson read to trainees
8___Role play
9___Scientific experiment

30. Which of the following would describe the training sessions? (Check "X" either YES or NO for each item.)

(1)	(2)	
___YES	___NO	The aides, volunteers, and classroom teachers were interested in the training session(s).
___YES	___NO	The aides, volunteers, and classroom teachers participated in most of the activities.
___YES	___NO	The facilities were adequate for the teaching activities used.
___YES	___NO	Various teaching techniques and activities were used during the training session(s).

31. How many aides do you have working with the EFNEP in your county? (Number)_____

32. How many EFNEP aides do you have participating in the conduct of this Study within your county? (Number)_____

33. How many EFNEP volunteers are working within your county? (Number)_____

34. How many EFNEP volunteers within your county are involved with this Study? (Number)_____

35. How many classroom teachers within your county are participating in this Study? (Number)_____

LESSON EVALUATION

Procedure for completing the Lesson Evaluation form:

A Lesson Evaluation form is included here for each of the six lessons to be taught. Each complete form consists of two sheets and each form (for Lessons 1 through 6) is printed on a different color of paper. Be sure that you have the correct form for the lesson taught before starting to fill in the form.

Please note that pages 1 through 3 are the same for each Lesson Evaluation form. On page 1 of the form you will indicate, by circling the proper number, which lesson is being evaluated. Page 4 varies for each lesson. There is a different page 4 for: Lesson 1--SUPER SNACKS; Lesson 2--MIGHTY MILK: Lesson 3--VITAMIN C FOR YOU AND ME; Lesson 4--MEET THE MEAT GROUP; Lesson 5--BRING IN BREADS AND CEREALS; and Lesson 6--EAT YOUR WAY TO VITAMIN A.

The information requested on page 4 is to determine the types of learning activities you used. It will provide an indication of the behavioral objectives and activities for the Nutrition Lesson Series that you were able to accomplish in the time allotted. You will not be able to do all the items listed on page 4, nor should anyone utilizing the Lesson Series expect to do so.

Remember the material (content) and methods of presentation should be chosen from the Lesson Series. (Only lessons 1 through 6 of the Lesson Series are to be used in this study.) Be sure to select your activities so that you feel comfortable using them. From your answers to this questionnaire, it is hoped to discover the types of activities you like to use with 8 through 12-year-old youth.

As soon as each lesson is completed, the corresponding Lesson Evaluation form should be filled in and returned to the Extension Home Economist in charge of the Study. This should be done at least once a week. All lessons should have been taught by February 7, 1975. The Posttest should be completed during the week of February 10, 1975.

NOTE: Group 3 "teachers" will not use the Lesson Evaluation forms.

County_____ State_____

LESSON EVALUATION

(To be filled in by "teacher" of the group after each lesson.)

FOR LESSON 1 2 3 4 5 6 (Circle one.)

1. Date_____
Month Day Year

2. Name_____ I.D._____

3. Group I.D. number_____

4. Meeting was held: (Check "X" one.)

1___In a home
2___In a community center
3___At school
4___Other. Specify_____

5. The time of day that the lesson was taught: (Check "X" one.)

1___After school
2___During the evening (after the evening meal)
3___During the school day
4___Other. Explain_____

6. Total number of youth enrolled in this group or class____

7. Total number of youth present for this class_____

8. The group included the following number of:

1___8-year-old boys
2___8-year-old girls
3___9-year-old boys
4___9-year-old girls
5___10-year-old boys
6___10-year-old girls
7___11-year-old boys
8___11-year-old girls
9___12-year-old boys
10___12-year-old girls

9. Check ("X") all the methods used to teach the lesson.

1___Demonstration
2___Display
3___Discussion
4___Field trip
5___Group activity
6___Lecture
7___Lesson read to youth
8___Role play
9___Scientific experiment

10. The lesson on nutrition lasted: (Check "X" one.)

1___15 minutes or less
2___16 to 30 minutes
3___31 to 45 minutes
4___46 to 60 minutes
5___Over an hour

PLEASE GIVE THE FOLLOWING INFORMATION FOR THIS LESSON:

1. After teaching the lesson on (Title)_____,
I felt: (Check "X" YES or NO for each statement.)

(1)	(2)	
___YES	___NO	Youth were interested in the lesson.
___YES	___NO	Lesson was too difficult for youth to understand.
___YES	___NO	Lesson was understood by youth.
___YES	___NO	Youth were restless and inattentive.
___YES	___NO	Youth participated in most activities.
___YES	___NO	Youth were interested in tasting new foods.
___YES	___NO	If a food was prepared in the previous lesson, youth commented that they had tried the food.
___YES	___NO	Facilities were adequate for activities.

2. If I taught this lesson again, I would: (Check "X" YES or NO for each statement.)

(1)	(2)	
___YES	___NO	Use different activities.
___YES	___NO	Involve the youth more in activities.
___YES	___NO	Use similar activities.
___YES	___NO	Teach the lesson similarly to the way I taught it this time.
___YES	___NO	Use a different method of teaching.

3. If YES to the last statement, check ("X") the one method you would use:

1___Demonstration
2___Display
3___Discussion
4___Field trip
5___Group activity
6___Lecture
7___Read lesson to youth
8___Role play
9___Scientific experiment

PLEASE CHECK THE OBJECTIVES AND ACTIVITIES THAT WERE ACCOMPLISHED IN THIS LESSON.

LESSON 1. SUPER SNACKS

1. Objectives: (Check "X" any that apply.)

1___Describe health of a healthy person.
2___Name different things that affect health.
3___Eat nutritious snacks.

2. If all objectives were not accomplished, it was because: (Check "X" any that apply.)

1___They were not suitable for the group.
2___They were too difficult for the group to achieve.
3___There was not enough time to achieve all objectives.
4___Other (please explain)_____

3. Check ("X") the activities that you chose to use with this lesson.

1___Select a meal from food models.
2___Play captain (from Bag of Tricks).
3___Have youth list snacks.
4___Prepare a snack.
5___Play word scramble (What Is Health?).
6___Other (please explain)_____

LESSON 2: MIGHTY MILK

1. Objectives: (Check "X" any that apply.)

1___Name two nutrients in milk and a reason they need each.
2___Recognize products made from milk.
3___Remember the number of servings recommended from the milk group.

2. If all objectives were not met, it was because: (Check ("X) any that apply.)

1___They were not suitable for the group.
2___They were too difficult for the group to achieve.
3___There was not enough time to achieve all objectives.
4___Other (please explain)_____

3. Check ("X") the activities that you chose to use with this lesson:

1___A brief review of Lesson 1 (SUPER SNACKS).
2___Prepare food made from milk (pudding, soup, etc.)
3___Experiment--vinegar and milk.
4___Serve milk foods.
5___Experiment--evaporated milk and powdered milk.
6___Show pictures or film.
7___Visit a dairy farm.
8___Visit the dairy section of the grocery store.
9___Other (please explain)_____

LESSON 3: VITAMIN C FOR YOU AND ME

1. Objectives: (Check "X" any that apply.)

1___Name some vitamin C foods.
2___Tell one reason why they need vitamin C.
3___Remember the number of servings recommended from this group.

2. If all objectives were not met, it was because: (Check "X" any that apply.)

1___They were not suitable for the group.
2___They were too difficult for the group to achieve.
3___There was not enough time to achieve all objectives.
4___Other (please explain)_____

3. Check ("X") the activities that you chose to use with this lesson:

1___Review briefly Lesson 2 (MIGHTY MILK).
2___Discuss fruit and vegetable group and number of servings needed in the food guide.
3___Play "I See Vitamin C Foods."
4___Each youth name fruits and vegetables containing vitamin C.
5___Prepare and serve raw fruits and vegetables.
6___Experiment--sprouting seeds.
7___Plant radishes.
8___Select vitamin C foods by playing grocery store.
9___Other (please explain)_____

LESSON 4. MEET THE MEAT GROUP

1. Objectives: (Check "X" any that apply.)

1___Name foods included in the meat group.
2___Name two nutrients in meat and a reason each is needed.
3___Tell whether foods in this group come from animals or plants.
4___Remember the number of servings recommended from the meat group.

2. If all objectives were not met, it was because: (Check "X" any that apply.)

1___They were not suitable for the group.
2___They were too difficult for the group to achieve.
3___There was not enough time to achieve all objectives.
4___Other (please explain)_____

3. Check ("X") the activities that you chose to use with this lesson:

1___Briefly review Lesson 3 (VITAMIN C FOR YOU AND ME).
2___Play "What Food Am I?"
3___Use flip chart, "How Food Affects You."
4___Prepare hamburger patty cooked at correct temperature.
5___Play "People and Their Food."
6___Experiment--tenderness of cuts of meat.
7___Visit a farm to see how animals are grown.
8___Play grocery store.

LESSON 5. BRING IN BREADS AND CEREALS

1. Objectives: (Check "X" any that apply.)

1___Name foods in the bread and cereal group.
2___Name two nutrients in foods of this group and a reason each is needed.
3___Look for "enriched" or name of wholegrain ingredient on labels of foods made from grains.
4___Remember the number of servings recommended from this group.

2. If all objectives were not met, it was because: (Check "X" any that apply.)

1___They were not suitable for the group.
2___They were too difficult for the group to achieve.
3___There was not enough time to achieve all objectives.
4___Other (please explain)_____

3. Check ("X") the activities that you chose to use with this lesson:

1___Have youth grind wheat.
2___Work food group puzzle (from Bag of Tricks).
3___Play "Tell About Food."
4___Name grains and foods made from them.
5___Explain enrichment and show labels of cereals that have been enriched.
6___Prepare foods suggested in the Fun Sheet.
7___Experiment--leavening agents.
8___Paste pictures of fruits, vegetables, and grains on the map.
9___Visit the bread and cereal sections of the grocery stores.

LESSON 6. EAT YOUR WAY TO VITAMIN A

1. Objectives: (Check "X" any that apply.)

1___Name some vitamin A foods.
2___Tell one reason why they need vitamin A.
3___Show how much fruit or vegetable counts as one serving.

2. If all objectives were not met, it was because: (Check "X" any that apply.)

1___They were not suitable for the group.
2___They were too difficult for the group to achieve.
3___There was not enough time to achieve all objectives.
4___Other (please explain)_____

3. Check ("X") the activities that you chose to use with this lesson.

1___Review all previous lessons.
2___Play "ZIP ZIP ZAP."
3___Use display cards for vitamin A foods.
4___Sing the song on the front of the Fun Sheet.
5___Show a serving from the fruit and vegetable group.
6___Prepare vegetables showing how to conserve nutrients.
7___Plan a tasting party.
8___Make pictures of parts of the body (refer to leader's guide).
9___Taste foods preserved in various ways--canned, frozen, dried, etc.
10___Visit a grocery store--choose fruits and vegetables as nutritious snacks.

ATTENDANCE RECORD

Procedure for completing Attendance Record forms:

The Attendance Record form is to be filled in by the "teacher" (aide, volunteer, or classroom teacher) of the group. A packet of nine Attendance Record forms is included here; that is, one to be used as a Master Form, one for the Pretest, six for the Nutrition Lesson Series, and one for the Posttest. All nine forms will be needed by Group 1 and Group 2 "teachers." Group 3 teachers will need only three of the Attendance Record forms--one to be used as a Master Form, one for the Pretest, and one for the Posttest. (NOTE TO GROUP 2 TEACHERS: If your class exceeds 22 youth, you will need an additional packet; these are available from the Home Economist in charge of the Study.)

One Attendance Record form should be labeled Attendance Record Master Form. This Master Form should be kept by the "teacher" of the group for the duration of the Evaluation Study. Each meeting's attendance should be recorded on the Master Form. The remaining forms are to be used to fill in the exact information for one meeting, and returned to the Home Economist in charge at least once a week.

At the end of the Study (that is, after the Posttest), the "teacher" will return the Attendance Record Master Form to the Home Economist in charge of the Study. This form must be returned in time to reach the State Cooordinator for mailing to North Carolina on February 14, 1975. This may mean that you need to schedule two meetings (lessons) a week. (NOTE: There are six and one-half weeks between January 1 and February 14, 1975.)

Each youth in Groups 1 and 2 will take the Pretest. Each youth in these groups who have attended at least five of the six lessons will take the Posttest. The lesson taught may be indicated on the Attendance Record by a check ("X") mark in the proper box. The date the lesson was taught is to be written in beneath the check mark. The day and month are sufficient; that is, January 10, 1975, would be written 1/10.

Each youth in Group 3 will take both the Pretest and the Posttest. They will not use the Lesson Series during the period of this Study. It is hoped that they will receive the benefit of the Lesson Series after the final collection of data for the Evaluation Study.

Record for week of_____ County_____ State_____

ATTENDANCE RECORD
(To be filled in by the "teacher" of the group)

Teacher_____I.D._____ Total number in group____

Group I.D._____ Names of other group leaders: Aide_____

Volunteer_____ Classroom teacher_____

Home economist_____

Names of the youth in the group Last First	Age	I.D. No.	(Check attendance in these columns) Pre-test	Lesson and date taught (below) 1	2	3	4	5	6	Post-test